

**AN EXPLORATION OF THE COGNITIVE AND BEHAVIOURAL
DIMENSIONS OF LAW STUDENTS' ONLINE LEGAL RESEARCH
PROCESSES**

by

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Abstract

Legal research is an essential skill for lawyers and a fundamental part of Canadian law school curricula. In recent years, legal research has shifted from a print-based activity to an online one. Legal research educators have argued that this transition requires law students to learn a new set of research behaviors and cognitive skills (Callister, 2010; Harker, 2013; Wheeler, 2011). However, this literature is largely conceptual in nature, and very little is known empirically about the experiences of law students as they conduct legal research online. The current study addresses this gap by examining the cognitive processes and online research behaviours that occur when law students conduct online legal research.

Five second-year law students from an Ontario university performed an online legal research task that was recorded. After completing the task, participants did a virtual revisit think-aloud (Beach & Willows, 2017), in which they verbalized their thoughts while viewing the screen recording of their research session. Participants also completed a demographic questionnaire and a semi-structured interview after the session. The data was analyzed using qualitative methods to gain an in-depth understanding of the participants' experiences conducting online legal research.

The analysis resulted in a taxonomy of cognitive processes during online legal research that closely resembles the cognitive processes and knowledge types described in Bloom's Revised Taxonomy of Learning Objectives (Anderson & Krathwohl, 2001). In addition, empirical evidence was found for key cognitive processes previously identified in the legal research literature, namely, evaluating and selecting relevant legal information; creating a research plan and reflecting on research processes; and the application of metacognitive skills. With respect to online legal research behaviours, this study found three broad categories of

research behaviour that were prevalent throughout the participants' research sessions: (1) Information-seeking behaviour, (2) Reading, and (3) Notetaking.

The study findings provide insights into the cognitive processes and research behaviours that law students engage in when conducting online legal research. These findings can inform the ongoing development of instruction, learning outcomes, support tools, and prompts to help students conduct online legal research more effectively.

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Chapter 1

Introduction

Legal research is an essential skill for lawyers and a fundamental part of the Canadian law school curriculum. The Law Society of Upper Canada Rules of Professional Conduct (2000) establish that lawyers in Ontario have a professional obligation to competently conduct legal research. Moreover, the Federation of Law Societies of Canada National Requirement (2018) requires that Canadian law school graduates entering a bar admission program have the demonstrated ability to conduct legal research. Examples of the specific legal research skills identified in the National Requirement include the ability to identify legal issues, to select sources and methods and conduct legal research relevant to Canadian law, and to use techniques of legal reasoning and argument to analyze legal issues (Federation of Law Societies of Canada, 2018, s. 1.2). Given the importance of legal research skills, legal research instructors and law librarians must develop effective legal research instruction and support for law students to become competent lawyers.

In recent years, legal research has become largely an online activity. Large databases such as WestlawNext and Lexis Advance Quicklaw dominate the legal information landscape, replacing what used to be primarily print-based research tools. Many legal research educators and law librarians have argued that the transition from print to electronic legal research tools requires that law students learn a new set of research behaviors and cognitive skills to be successful in the online legal research environment (Callister, 2010; Harker, 2013; Wheeler, 2011). However, this literature is

largely conceptual in nature, and very little is known empirically about the experiences of law students as they conduct online legal research. A handful of empirical studies have been conducted examining specific aspects of students' online legal research experiences such as their research strategies and outcomes (Krieger & Kuh, 2014) and their critical evaluation skills (Wu & Lee, 2012). However, these studies were limited in their scope in that they focused on specific research behaviours and cognitive processes (Krieger & Kuh, 2014; Wu & Lee, 2012).

This study addresses this gap by exploring the full range of cognitive processes and online research behaviours that occur when law students conduct online legal research. This examination will provide a more detailed understanding of what occurs during the online legal research process. With a more detailed understanding, legal research instructors and law librarians can be better equipped to develop effective teaching strategies, support tools, and interventions to improve law students' competency in conducting online legal research.

Autobiographical Statement

I have been a law librarian at William R. Lederman Law Library at Queen's University since 2008. I have taught several legal research courses, guest lectured in law classes, and assisted many law students as they grapple with learning how to conduct legal research. During this time, the legal information ecosystem has shifted from being largely print based to mostly online. This shift has led me to wonder how law students' experiences and processes conducting legal research have changed, and if so, how law librarians can best support successful research outcomes for law students in this digital

environment. It is my curiosity to understand how the digital environment has impacted law students' legal research processes that has inspired this research project.

Chapter 2

Literature Review

The following review of the literature includes three main topics that are relevant to this study: (1) the legal research process, (2) cognitive processes in legal research, and (3) information searching behaviour in legal research. The literature on the legal research process is included in the review because it describes a widely used process that is taught to law students, which informs their online legal research experiences. The literature on cognitive processes and information searching behaviour in legal research is included because it provides a deeper understanding of the online legal research experience. All three topics contribute a foundation to the current study. The final section of this chapter will describe the research purpose and research questions for this study.

The Legal Research Process

Legal research can range from simple look-up tasks (such as looking up a known case or statute by its name or citation in a legal database) to complex, multi-step processes that involve consulting numerous legal research tools to construct a legal opinion or argument based upon authoritative legal sources. This section of the literature review focuses on the latter type of legal research process, which operates in the context of legal problem-solving and sets the foundation for this study.

Legal problem-solving and legal research are closely connected and can be thought of as one integrated process. According to Fitzgerald, “legal problem-solving is simply figuring out what your problem is, finding the relevant law and applying the law to your particular situation” (2016, p. 1). Similarly, McCallum, Schmederman, and Kunz

state that the research that lawyers do “is part of a process of solving problems for their clients” (2017, p. 475).

The legal research and problem-solving process is generally taught to students in Canadian law schools using the FILAC method, or a variation thereof (described below). Several Canadian legal research textbooks offer the FILAC method as a model for understanding and carrying out the legal research and problem-solving process (e.g., Fitzgerald, 2016; McCormack, Papadopoulos, & Cotter, 2015). The FILAC method consists of the following five steps:

1. Facts – analyze the facts.
2. Issues – determine the legal issues.
3. Law – find the relevant law.
4. Analysis – analyze the law and apply it to the facts.
5. Communication – communicate the results of the research.

The first two steps in the FILAC process instruct students to analyze the facts of the problem in depth, properly identify the legal issues, and understand the problem in legal terms. In the third step, students find the primary sources of law (cases and statutes) that are relevant to the legal issues identified in the problem. In step four, students read and analyze the cases and statutes they have found and apply them to the facts of the problem. In step five, students communicate the results of their research in a format most appropriate for the audience (e.g., a legal memo, a client letter, or a court factum).

Although the FILAC method presents the legal research process as series of five sequential steps, in reality, Fitzgerald notes that these steps “overlap and are repeated over and over as a researcher begins to solve a legal problem” (2016, p. 4). The FILAC

method is an important process for law students to learn because it teaches a methodical, organized, and efficient approach to legal research and problem-solving.

While the FILAC model offers a high-level approach to legal problem-solving in which researching the law is a central step, it does not provide specific guidance on how to conduct the research necessary to find the law. Further guidance is needed to help law students efficiently navigate their way through the many legal research tools that are available to find the cases and statutes that are authoritative for a given legal problem. Legal research instructors and librarians often rely on legal research checklists such as Lederman Law Library's *Legal Research Checklist* (guides.library.queensu.ca/legal-research-checklist) or Bora Laskin Law Library's *Legal Research Process* (library.law.utoronto.ca/legal-research-tutorial/legal-research-process#4) to teach law students a process for how to research the law.

These checklists share many common characteristics that help students conduct legal research efficiently and avoid missing relevant legal authorities. One of these characteristics is to advise students to start their research with a secondary source. Secondary sources include sources such as legal encyclopedias, textbooks, treatises, journal articles, and other works of commentary on the law. Consulting a secondary source at the start of the research process is good advice; it helps students gain a solid understanding of the area of law being researched, locate key cases and statutes, and frame the legal issues in the problem. It can also prevent students from getting lost in a sea of cases without having a proper understanding of the relevant legal issues. Another common piece of advice found in the checklists is to “note-up” the cases they have found before finishing their research. The term “noting-up” refers to the process of looking up

the appeal history and subsequent judicial treatment of the cases they have found to ensure that the cases still have binding legal authority. Specialized research tools such as WestlawNext KeyCite and LexisNexis QuickCite have been developed specifically for this purpose.

The approaches to legal research described in the FILAC model and the legal research checklists have been practiced for many years and are well-established in the field of Canadian legal research instruction. It is essential that law students learn these approaches so that they can conduct legal research efficiently and effectively.

Cognitive Processes in Online Legal Research

Bloom's Revised Taxonomy of Educational Objectives is a well-established learning theory that was designed with the purpose of assisting educators with designing and classifying statements of learning objectives (Anderson & Krathwohl, 2001). Accordingly, the taxonomy provides a detailed categorization of the cognitive processes and knowledge types that are activated during learning. While designed with the intention to describe learning objectives, Bloom's Revised Taxonomy has also been used to conceptualize the cognitive processes that occur during constructive online research tasks (Marchionini, 2006; Rieh, Collins-Thompson, Hansen, & Lee, 2016; Vakkari, 2016). As such, it should also be a useful tool to analyze the cognitive processes that occur during online legal research.

Bloom's Revised Taxonomy consists of two dimensions: a knowledge dimension and a cognitive process dimension. The knowledge dimension includes four types of knowledge that can be activated during learning: (a) factual knowledge (knowledge of terminology, specific details, and elements), (b) conceptual knowledge (knowledge of

classifications, categories, principles, theories, and models), (c) procedural knowledge (knowledge of subject-specific skills, techniques, and methods, as well as knowledge of criteria for determining when to use appropriate procedures), and (d) metacognitive knowledge (knowledge of cognition in general as well as awareness of one's own cognition) (Krathwohl, 2002).

The cognitive process dimension consists of six cognitive process categories: (a) remember (recognizing, recalling), (b) understand (interpreting, classifying, summarizing, etc.), (c) apply (executing, implementing), (d) analyze (differentiating, organizing, attributing), (e) evaluate (checking, critiquing), and (f) create (generating, planning, producing) (Krathwohl, 2002). The categories of cognitive processes listed above form a scale from simplest (Remember) to most complex (Create). However, as Krathwohl (2002, p. 215) notes, "the requirement of a strict hierarchy has been relaxed to allow the categories to overlap one another." Thus, certain processes lower down the chain may be more cognitively complex than some of the processes higher up (e.g., explaining is more cognitively complex than executing).

The Director of the Leon E. Bloch Law Library and Professor of Law, Dr. Paul Callister, proposed an adaptation of Bloom's Taxonomy to identify the cognitive skills that legal research educators should teach to law students (2010). This Adapted Taxonomy consists of six high-level cognitive processes that are relevant to legal research: (a) remembering, (b) understanding, (c) application, (d) analysis and synthesis (together as an iterative process), (e) concluding, and (f) metacognition. Callister acknowledges that the taxonomy is only a starting point for constructing a model for the field of legal research instruction and encourages readers to fill in the Adapted Taxonomy

with greater detail of their own. Table 1 lists the cognitive processes in Callister's Adapted Taxonomy, with examples showing how each one relates to the legal research process.

Table 1

Cognitive Processes in Callister's (2010) Adapted Bloom's Taxonomy for Legal Research

Cognitive Process	Examples
Remembering	Recognizing an information problem or deficit
Understanding	Defining, explaining, outlining, and exemplifying research concepts, paradigms (schemata), and issues
Application	Exercising schemata for research interviews, problem typing, resource maps, and the research process
Analysis and Synthesis	Separation, identification, and reordering of elements for research problems encountered in legal practice (analysis)
	Recognizing relationships between legal issues, resources, alternative scenarios for analysis, and possible options as solutions (synthesis)
Concluding	Reporting back and producing a conclusion
Metacognition	Assessing the result of research, as well as the schemata and processes leading to the result

Note: From Callister, 2010

In addition, legal research educators have identified several higher-level cognitive processes that are essential for success in the online legal research environment. These processes include evaluating and selecting relevant legal information, creating a research plan, and the ability to apply certain metacognitive skills. For example, Wheeler (2011) argued that in the computerized legal research environment, researchers are no longer guided by the structure or context of information, which means they must rely more heavily on their own analytical skills to evaluate the relevance of legal information that

they find. Similarly, Jones (2009) noted that researchers must be able to sort through vast amounts of information in online legal databases and decide which pieces of information to pay attention to. Butler (2002) found that the failure of proper “evaluation and selection” led to misapplications and misstatements of the law, which had serious consequences for practicing attorneys. Harker exhorted law librarians and legal research educators to “consciously and explicitly address the difference between teaching students to evaluate sources of legal information and teaching them to analyze legal information itself” (2013, p. 88). Furthermore, Valentine argued that legal research is a problem-solving process that requires “creating a research plan, researching, and reflecting on what has been found, applying it to both the issue at hand and to the original research plan, and repeating the process as needed until applicable legal context and specific rules and procedures are distilled” (2009, p. 219). Lastly, several experts have identified metacognitive skills – specifically the ability to articulate when and where to use specific research strategies and to reflect on the success of those strategies - as an important, but missing piece in current legal research curricula (Harker, 2013; Niedringhaus, 2010). In sum, the shift from print to online legal research has made high-level cognitive processes such as evaluating and selecting relevant legal information, creating a research plan, and applying metacognitive skills more important for research success than ever.

This review has shown that Bloom’s Revised Taxonomy serves as a good starting point with which to analyse the cognitive processes that occur during legal research. In addition, several authors have identified specific high-level cognitive processes that have gained increased importance in the era of computerized legal research. However, much of the literature that addresses cognitive processes in online legal research is conceptual in

nature (Callister, 2010; Harker, 2013; Jones, 2009; Niedringhaus, 2010; Valentine, 2009; Wheeler, 2011). The current study will add to this body of knowledge by finding empirical evidence for the cognitive processes that occur during law students' online legal research processes.

Information-Seeking Behaviour in Online Legal Research

Ellis' seminal model of information-seeking behaviour (1989) provides a means of understanding users' interactions with information sources, and therefore provides a foundation for understanding law students' research behaviours within online legal databases. The model consists of a list of information-seeking activities and descriptions, which are summarized as follows:

- Starting: the initial search for information in which potentially relevant sources are identified.
- Chaining: following (backwards or forwards) chains of citations or other types of connections between materials.
- Browsing: semidirected searching in areas of potential interest, such as scanning tables of contents, indices, and subject headings.
- Differentiating: assessing and filtering sources by examining differences in nature and quality.
- Monitoring: maintaining awareness of developments in a subject area by regular checking of key sources.
- Extracting: systematic examination of a particular source to extract material of interest.
- Verifying: checking that information (e.g., data, citations) is correct.

- Ending: additional seeking at the end of a project, for example, a final search of the literature. (Case & Given, 2016, p. 151)

This list of activities is not meant to indicate a fixed sequence of events, but instead the order of the events can change depending on the “unique circumstances of the information activities of the person concerned at that particular point in time”

(Savolainen, 2017, p. 598). Ellis’ model has been used to describe interactions with information sources for various groups of people in many disciplines and contexts, such as physicists and chemists (Ellis et al., 1993), engineers and scientists (Ellis & Haugan, 1997), social scientists (Meho & Tibbo, 2003), and more recently, lawyers (Makri et al., 2008).

Ellis’ model was originally developed out of a series of grounded theory studies into the information-seeking behaviour of social scientists, which were conducted in the late 1980s (Savolainen, 2017). Although the model originated in an era of paper-based research, it maintains its relevance today. The model has been updated and elaborated upon by researchers in more recent studies to reflect the changes to information-seeking brought about by the Internet (Makri et al., 2008; Meho & Tibbo, 2003). The most relevant elaboration for the current study is one that arose from a study of academic lawyers’ use of electronic legal resources for their work (Makri et al., 2008). Based upon their observations of academic lawyers’ online information-seeking behaviour, Makri et al. (2008) made several additions and refinements to Ellis’ model, some of which are shown in Table 2. For example, ‘searching’ was added to the model, an information-seeking behaviour that is integral to online environments. They also added the behaviour of ‘updating’ (gaining a current understanding of the importance of a particular

document), highlighting its particular relevance within the legal domain (Makri et al., 2008). They also identified the following levels at which lower level behavioural characteristics can operate in relationship with electronic resources:

- Resource level: the level of the electronic resources itself.
- Source level: the level of an information source or sources within a particular electronic resource.
- Document level: the level of a document or documents within a particular information source.
- Content level: level of content within a particular document.
- Search query/result level: level of search query or search results. (Makri et al., 2008, p. 620)

Table 2

Summary of Makri et al. 's (2008) Refined Model of Information-Seeking Behaviour

Higher level behaviours	Related lower level behaviours
Identifying and locating	Surveying – D&C Monitoring – S, D&C Searching – R, S, D, C Browsing – R, S, D, C Chaining (forwards/backwards) – D&C Extracting – D
Accessing – R	
Selecting and processing	Distinguishing – S, D Filtering – D&C Selecting – R, S, D Extracting – C Updating – D&C Recording – R, S, D&C, Q Analysing – C Collating and editing – D&C

Key: R = resource level, S = source level, D = document level, C = content level, D&C – combined document/content level, Q = search query/result level

Note: From Makri, et al., 2008

Ellis' model, along with the refinements made to it by Makri et al. (2008), bear some resemblance to the legal research checklists that are often used to teach law students the process for conducting legal research. For example, the activities of surveying, browsing, and chaining shown in Makri et al.'s (2008) refinement of the model are frequently performed in the context of consulting secondary sources, which is a recommended step at the beginning of most legal research checklists. Furthermore, the activity of updating, which was added to the model based on observations of academic lawyers' information-seeking behaviour (Makri et al., 2008), also appears on the legal research checklists (usually as a final step) used to teach law students.

Several prominent legal research educators have further elaborated on the research behaviours that are essential in the online legal research environment. The use of secondary sources (e.g. legal encyclopedias, treatises, and other works of legal commentary) at the outset is widely viewed as essential for success in legal research, especially when conducting legal research online (Eaton, 2010; Harker, 2013; Krieger & Kuh, 2014; McKenzie & Vaughn, 2011). This is partly to make up for the absence or obscurity of visual cues in online legal research environments that indicate the underlying conceptual structure of the law, cues that were once so prevalent in the indices and subject headings of print-based research tools such as case digests and law reports (Butler, 2002; Harker, 2013). A keyword search in a legal database such as WestlawNext will produce an extensive list of cases addressing numerous topics and legal issues, and modern search algorithms are designed to elevate the most 'relevant' cases to the top of the search result list. However, the relevance of these cases is only as accurate as the

search terms entered by the researcher. If the researcher possesses a limited understanding or no understanding of the relevant legal issues, then his or her keywords will reflect this, and so will the search results that have been generated by the database. What is missing from these database keyword search results is an indication of the relationship of the cases to one another and to the larger conceptual structure of the law (Butler, 2002; Harker, 2013). The use of secondary sources such as textbooks and treatises can help to remedy this situation in several ways. First, the tables of contents in legal textbooks and treatises are usually organized to reflect the structure of the law and can thus provide law students with a sense of the conceptual structure that was once so readily available in print law reports and case digests. Second, secondary sources can provide novice legal researchers with the correct legal vocabulary with which to search legal databases and generate relevant search results. Third, secondary sources provide legal researchers with the contextual understanding of the law that is necessary to properly interpret the cases that are generated in the legal database keyword search results. To summarize, one result of the transition from print to online legal research has been the loss of visual cues to the conceptual structure of the law, but this loss can at least be partially made up by using secondary sources at the start of the research process.

However, law students may not use secondary sources in the online legal research environment as often as legal research educators would like. A study comparing the research and reasoning processes of law students conducting legal research using electronic versus print resources found that secondary sources constituted 88% of the sources accessed by participants using only print resources, and only 22% of the sources accessed by participants using electronic resources. Furthermore, case law constituted

only 2% of the sources accessed by print researchers and 60% of the sources accessed by electronic researchers (Krieger & Kuh, 2014). Moreover, the print subjects tended to start their research by referencing secondary sources, while electronic subjects were more likely to start their research by accessing case law (Krieger & Kuh, 2014).

A related online legal research behaviour that is frequently endorsed by legal research educators is browsing (Eaton, 2010; Krieger & Kuh, 2014; McKenzie & Vaughn, 2011; Meyer, 2016). Browsing has been defined as surveying or scanning a table of contents, index, or similar compilation to identify topics warranting further research (Krieger & Kuh, 2014). According to some, browsing is a means to “re-create the sign-posts” (McKenzie & Vaughn, 2011) that have disappeared or become less prominent in the online research environment, and to build context for the information being sought and used. One prominent legal research educator believes that browsing reduces the information overload that can occur when conducting online legal research (Meyer, 2016). However, like the use of secondary sources, browsing may not be a skill that is heavily relied upon by law students in the online legal research environment. The same study that found lower use of secondary sources among law students conducting legal research online, also found that participants who were using online sources exclusively browsed far fewer times than participants who were using print sources (six occasions versus 26 occasions) (Krieger & Kuh, 2014). This finding is corroborated by Eaton, who has written anecdotally about the difficulty in convincing students to use online sources that organize the law by topic, sub-topic, and issue (2010). He attributes this lack of interest in browsing organized knowledge structures to the expectation of

members of the “Google Generation” that information should be easily retrievable through a keyword search of a database (2010).

The prominence of Google-like search boxes on University library websites may be reinforcing students’ expectations that research should be as simple as entering a few keywords into a search box. In recent years, university libraries across North America have implemented discovery tools on their websites that provide a simplified interface for searching library resources. While simplified search tools such as this may satisfy faculty and students’ desire for a “simplified, fast, all-inclusive, and principally online research experience” (Asher, et al., 2013), they may be doing so at the cost of quality research outcomes. For example, a study by Dahlen et al. (2017) found that the articles students selected from the library discovery tool were less authoritative than the articles that students selected from an indexing and abstracting database, even though students felt more satisfied with the search results they had found using the discovery tool.

Like university library websites, commercial online legal research tools also contain Google-like search boxes that sit prominently on their homepages. In WestlawNext, the search box is positioned at the very top of the homepage (see Figure 1). In addition, links to key legal secondary sources such as the Canadian Encyclopedic Digest in WestlawNext are located farther down on the homepage, where they are less likely to be seen (see Figure 1). Moreover, the link to the Canadian Abridgment Case Digests (CACD), which was once Canada’s pre-eminent case law finding tool and legal classification system, is buried near the very bottom of the WestlawNext homepage (see Figure 1), and the search results from a keyword search in WestlawNext do not include content from the CACD. Taken together, the prominence of Google-like search boxes on

the homepages of commercial legal research tools along with a lack of clear access to important secondary sources may be contributing to law students' lack of interest in using secondary sources and browsing organized knowledge structures online.

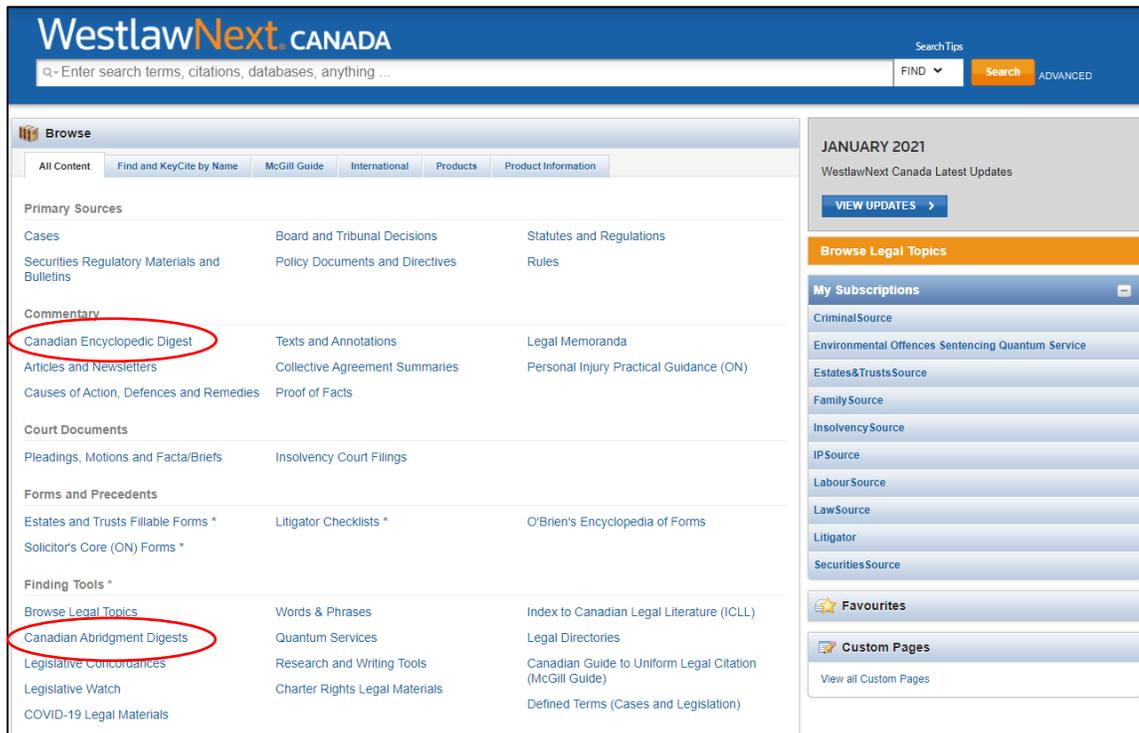


Figure 1

Screen Capture of WestlawNext Homepage

In summary, this review has canvassed the range of cognitive processes and research behaviours that have been highlighted in the literature as important during the online legal research process. However, much of the existing literature is theoretical in nature, and therefore cannot provide insight into law students' online legal research experiences. The aim of the current study is to begin to fill this gap by providing empirical evidence for the cognitive processes and research behaviours that occur when law students conduct online legal research.

Study Purpose and Research Questions

The purpose of this study is to gain an in-depth understanding of law students' online legal research processes. As mentioned earlier, much of the existing literature has been conceptual in nature (Callister, 2010; Harker, 2013; Jones, 2009; Niedringhaus, 2010; Valentine, 2009; Wheeler, 2011). The few empirical studies that exist have addressed specific cognitive processes and behaviours (Krieger & Kuh, 2014; Wu & Lee, 2012). However, these studies did not examine the full range of cognitive processes and behaviours that could arise during online legal research. To address this gap, the current study will gather empirical data on the full range of cognitive processes and behaviours that occur when law students conduct an online legal research task. This will provide a more comprehensive understanding of the phenomenon.

In addition, there has yet to be a study that uses the virtual revisit think-aloud methodology (Beach & Willows, 2017) in the context of online legal research. This methodology is highly applicable to the current research study because it has been shown to produce detailed information about high-level cognitive processes (Beach & Willows, 2017).

With a more detailed and comprehensive understanding of law students' online legal research processes, legal research educators, including law librarians, will be more equipped to develop effective teaching tools and supports to improve law students' competency with online legal research. To explore law students' online legal research processes, the following research questions were used to guide this study:

1. What cognitive processes do law students employ as they conduct online legal research?

2. What research behaviours do law students perform when conducting online legal research?

Chapter 3

Methods

Research Design

This study used qualitative methods to examine the legal research processes of law students as they conducted online legal research to solve a legal problem. Qualitative methods were used because they allow the researcher to explore the central phenomenon in a way that is both open and comprehensive, allowing the development of a good understanding of the phenomenon in its complexity (Clark & Creswell, 2015). Specifically, the researcher used a general inductive approach to qualitative analysis that allows research findings to emerge from the “frequent, dominant or significant themes inherent in the raw data” (Thomas, 2003, p. 238). This approach was also chosen because there are few pre-existing qualitative studies on law students’ online legal research processes.

Four data sources were used for this study: (a) demographic questionnaires, (b) think-aloud protocols, (c) computer screen recordings, and (d) semi-structured interviews. These components were analyzed at specific phases of the coding process, as described in the data analysis section below.

Context

The study took place in a mid-sized Canadian law school. All Canadian law schools, including the one where this study took place, must ensure that graduating students have the demonstrated ability to conduct legal research (Federation of Law Societies of Canada, 2018). The law school in this study affords students many opportunities to develop their legal research skills. All first-year students are required to

complete and pass a mandatory legal skills course of which legal research is a core component. In addition, students must complete a mandatory upper-year practice skills requirement, which may be fulfilled by taking a course in Advanced Legal Research, volunteering for a law school clinic or law journal, or by participating in a competitive moot (a simulated court or arbitration proceeding). The results of this study could be used to inform the development of teaching support tools in introductory legal skills courses or advanced legal research courses at any Canadian law school.

Participants

This study employed a purposeful sampling approach, which is often used in qualitative studies. Purposeful sampling relies on relatively small samples of ‘information rich’ cases selected for in-depth study (Patton, 2015). Information rich cases are ones that by their “very nature and substance illuminate the inquiry question being investigated” (Patton, 2015, p. 264). Small sample sizes are desirable because they enhance the validity of fine-grained, in-depth inquiry that seeks to explain phenomena (Crouch & McKenzie, 2006).

Five students from the second year of the *Juris Doctor* (JD) program were recruited for this study. In Canada, the *Juris Doctor* degree is the first-level common law degree. Having this degree is one of the pre-requisites for practicing law in Canada. The decision to select JD students from within the same year was made to ensure that all participants had roughly the same degree of legal research experience and knowledge of the law.

Participants selected for the study were required to meet two criteria. First, they must have completed the mandatory first-year Introduction to Legal Skills course offered

by the law school, which contains a legal research component. This ensured that all participants had a basic level of legal research skill and knowledge. Second, they must have had prior training using the WestlawNext database. This eliminated the need to teach participants how to use WestlawNext during the study, thereby saving time for both the researcher and the participants.

Participants were recruited via several channels. The researcher placed posters in visible places around the law school, as well as placing announcements in the online law student newsletter, and on class Facebook pages. The researcher also visited law classes in person to announce the study. Participants received a \$30 Amazon gift card as compensation for their time and contribution to the study.

All participants filled out a demographic questionnaire, which was part of the study (see Appendix B). The results of the demographic questionnaire revealed that three females and two males between the age of 20 and 30 participated in the study. Most of the participants reported using WestlawNext Canada at least once per week ($n = 4$, 80%). All participants reported feeling confident in their ability to use the Internet for research and to conduct legal research to solve a legal problem. In addition, most participants felt confident in their ability to use WestlawNext Canada to conduct legal research ($n = 4$, 80%). Table 3 provides details concerning the demographic characteristics of the participants.

Table 3
Demographic Characteristics of Participants

Characteristic	Frequency <i>n</i>
Gender	
Female	3
Male	2

Age	20-25 years	4
	26-30 years	1
WestlawNext Canada Frequency of Use	Never	0
	Once/year	0
	Once/month	2
	Once/week	2
	> once/week	1
Confidence in Ability to Use Internet for Research	Strongly agree	2
	Moderately agree	3
	Neither agree nor disagree	0
	Moderately disagree	0
	Strongly disagree	0
Confidence in Ability to Conduct Legal Research to Solve a Legal Problem	Strongly agree	1
	Moderately agree	4
	Neither agree nor disagree	0
	Moderately disagree	0
	Strongly disagree	0
Confidence in Ability to Use WestlawNext Canada to Conduct Legal Research	Strongly agree	1
	Moderately agree	3
	Neither agree nor disagree	1
	Moderately disagree	0
	Strongly disagree	0

Data Sources

This study used four data sources: demographic questionnaires, think-aloud protocols, recordings of participants' research sessions, and semi-structured interviews.

Demographic Questionnaire

A demographic questionnaire was administered to participants using Qualtrics, an online survey program. The purpose of the questionnaire was to gather data about

relevant factors that may affect students' online legal research processes (e.g., age; year of study; prior legal research experience; level of confidence using legal research tools). Participant confidentiality was preserved by assigning codes to each questionnaire in lieu of names. This was accomplished by giving each participant a code ahead of time and asking them to put the code on the questionnaire instead of their name. This code was also used to label all other documents and files containing data about that participant. The questionnaire can be found in Appendix B.

Recording of Research Session

The participants' online legal research sessions were recorded using the screen capture software, Camtasia Studio. The recordings were played back to students during the virtual revisit think-aloud portion of the meeting to prompt their verbalizations. The recordings were also used as a data source to examine participants' online behaviours during the legal research process.

Think-Aloud Protocol

Participants completed a thirty-minute virtual revisit think-aloud during the one-on-one meeting (Beach & Willows, 2017). The primary purpose of the think-aloud was to gather data about participants' cognitive processes and research behaviours during the legal research task.

The think-aloud method has been widely used to understand human problem-solving and online information-seeking behaviour (Branch, 2003; Tenopir, et al., 2008; van Someren, et al., 1994). In the think-aloud method, the participants' verbalizations are recorded and transcribed, and the resulting transcripts or 'verbal protocols' are analyzed (van Someren et al., 1994). The think-aloud method "generates direct data about ongoing

cognitive processes that occur during task performance” (Beach & Willows, 2017, p. 62), making this method ideally suited for capturing the cognitive processes that occur during the legal research process.

There are several variations of the method including concurrent, retrospective, and virtual revisit think-aloud methods. Unlike the concurrent method, in which participants are asked to verbalize their thoughts while doing the task, the virtual revisit method allows participants “to review and comment on a visual recording of how they interacted with a particular website” (Beach & Willows, 2017, p. 63). The virtual revisit method is preferable to the concurrent reporting method when studying online search behaviour because concurrent reporting can become difficult to maintain under conditions where cognitive load is already high (Beach & Willows, 2017; Ericsson & Simon, 1993). This can result in verbalizations that reflect simple descriptions of online actions and navigational choices (Beach & Willows, 2017). Participants in a virtual revisit think-aloud condition, on the other hand, are more likely to verbalize higher level cognitive processes and offer richer explanations about decisions than they would in a concurrent think-aloud condition (Beach & Willows, 2017). The virtual revisit method is also preferable to a pure retrospective reporting method because participants in an uncued retrospective reporting condition are likely to omit describing and explaining their online actions and navigational decisions because of difficulty with recall (Beach & Willows, 2017).

The participants’ verbalizations during the think-aloud were recorded together with a playback of the Camtasia recording of their legal research session. The audio

portion of the think-aloud recordings were transcribed, and the resulting transcripts or ‘verbal protocols’ were coded and analyzed (van Someren et al., 1994).

Semi-Structured Interview

Each participant was interviewed after completing the research session and the virtual revisit think-aloud. A semi-structured interview format (Patton, 2015) was followed because it allows the interviewer freedom to explore, probe, and ask questions based on what happened during the legal research task and think-aloud session. In addition, some questions used Likert scales to gauge the participants’ comfort and experience levels with different aspects of the research and think-aloud tasks.

The interview contained seven questions. Questions one and two (semi-structured) provided an opportunity for the researcher to ask about cognitive processes that were not fully explored during the think-aloud. Questions three and four (semi-structured) allowed the researcher to ask the participant about challenges they faced during the legal research task and the supports they desired. Questions five, six and seven (semi-structured and Likert) allowed the researcher to gather information about conditions that may have influenced the participant’s research process and/or their think-aloud.

The interviews were audio recorded using the screen capture software, Camtasia Studio, and transcribed verbatim for later analysis. A sample of the interview questions are included in the data collection procedure document in Appendix C.

Data Collection Procedure

The data for this study were collected via a demographic questionnaire and one-on-one meetings with the participants. The participants were asked to fill out the

demographic questionnaire online in advance of the one-on-one meeting. The researcher received informed consent for all parts of the study when the participants completed the online questionnaire.

This section provides an overview of the data collection procedure for the one-on-one meeting, as well as the measures the researcher took to protect participants' confidentiality. A full description of the data collection procedure for the one-on-one meeting can be found in Appendix C.

One-on-One Meeting

Participants met with the researcher for a one-on-one meeting at a time that was most convenient for the participants. The meetings took place in the researcher's office because it contained the computer equipment that was required for the study. The meeting followed the sequence of events described below and lasted approximately 120 minutes.

Introduction

The researcher restated the purpose of the research and reviewed the letter of information and consent form with the participants.

Online Legal Research Task

The participants completed the online legal research task. The task was adapted from an in-class legal research exercise that was given to first-year JD students at the law school in 2014. The exact text of the legal research task that was given to the participants is replicated below:

Mr. Arnold owns a house in the picturesque neighbourhood of Sunny Acres, Kingston, which is located on the shores of Lake Ontario. From the large front

windows of Mr. Arnold's house one can take in a lovely view of Goose Bay. Mr. Arnold's neighbours from across the street, Mr. and Mrs. Barnes, recently purchased a 40-foot Winnebago motorhome, which they have parked on their property beside their house. Unfortunately, they have parked the motorhome in a location that happens to be directly across the road from Mr. Arnold's front window. Mr. Arnold is very upset because the motorhome blocks his treasured view of the lake and he has asked his neighbours several times if they could park it elsewhere, but they have refused. Mr. Arnold is now seeking legal advice regarding whether or not the parked motorhome might give rise to an action based on nuisance against Mr. and Mrs. Barnes.

Your principal has asked you to find some preliminary information that might assist her in advising Mr. Arnold. She is leaving the office to catch a train in half-an-hour, and she would like to be able to review the information you have located while she is on the train. By the end of the half hour, she would like you to give her a short list of two or three potentially relevant documents, along with a brief verbal explanation of why you chose them.

You have in front of you a computer workstation with WestlawNext and an open Word document. Please use only WestlawNext to conduct the legal research for this task. Please record any notes you wish to take on the open Word document.

A time limit of 30 minutes was intentionally placed on the participants to limit the data that was produced to an amount that could reasonably be analyzed by the researcher. In addition, the participants were instructed to use WestlawNext and no other database or

research tool so that the researcher could more readily compare on-screen activities across the participants. WestlawNext was chosen because of its robust Canadian primary source content and the fact that it includes several key Canadian legal research tools such as the Canadian Abridgment Case Digests, the Canadian Encyclopedic Digest, the Index to Canadian Legal Literature, and KeyCite.

Post-Task Interview Question

After the research task was complete, the researcher conducted a brief post-task interview with the participants. The post-task interview brought the research task to a close by asking the participant to explain which documents they had chosen for the principal.

Virtual Revisit Think-Aloud Session

After the participants completed the legal research task, they were given instructions for the virtual revisit think-aloud. The purpose of giving the think-aloud instructions after the task was complete was to reduce reactive influences that the verbalizations might have had on the decision-making process (Beach & Willows, 2017; Raynard & Svenson, 2010). The following passage outlines the think-aloud instructions, which were adapted from Beach and Willows (2017):

I'm going to play back what you did and ask you to think-aloud while viewing the recording. What I mean by think-aloud is that I want you to tell me everything that you were thinking from the time you began the research task until you finished it. I would like you to talk aloud constantly. I don't want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep

talking. I will prompt you to continue talking if you pause for more than 30 seconds.

Prompts, redirections, and interventions were minimized during the verbalizations to avoid disrupting participants' cognitive processes (Beach & Willows, 2017; Jaspers, 2009). The only prompts given were asking the participant to keep talking if they paused for more than thirty seconds.

Prior to the think-aloud session, the participants were given a short practice exercise in thinking aloud. For the practice exercise, the participant was asked to conduct a brief legal research task on the WestlawNext database. The practice task provided the participant with an opportunity to become familiar with thinking aloud while simultaneously viewing a screen recording of their legal research session. The researcher provided feedback to each participant to ensure that they were verbalizing their thought processes as clearly as possible.

Post Think-Aloud Interview

The researcher conducted a brief interview with the participants following the completion of the think-aloud session. At the end of the interview, the participant was thanked and given a \$30 gift card for their contribution.

Confidentiality

Pseudonyms were given to each of the participants to protect their identities and to facilitate data presentation, and an arbitrary identity code was assigned to all their data files. All electronic data has been stored and will be securely protected for a minimum of five years or beyond, in accordance with the General Research Ethics Board Standard Operating Procedures.

Data Analysis

The data sources that were analyzed in this study included the think-aloud audio recordings, the video recordings of the participants' research sessions, and the audio recordings of the semi-structured interviews. Each of these data sources were prepared in specific ways to facilitate the process of analysis. Accordingly, this section will begin by describing how each data source – the think-aloud protocols, the Camtasia recordings, and the semi-structured interviews - was prepared prior to analysis.

Next, the analytic procedures that were followed to answer both research questions in the study will be described. Thus, the sub-section that describes the analytic procedures will be organized according to the two research questions in the study.

Preparing the Data

Think-Aloud Audio Recordings

The think-aloud recordings were initially transcribed using a transcription service called Trint (see trint.com). These machine-generated transcripts were very rough and therefore the researcher had to make numerous manual corrections. This process resulted in verbatim transcripts of the think-aloud protocols.

The transcripts were then divided into thought-based units based on the process described in the analysis section below. Each unit of the transcript was also assigned a timestamp based on its temporal positioning within the recording. The timestamps facilitated matching the words from the participants' think-alouds with the actions that occurred simultaneously on the computer screen within the video recording of the research tasks.

Research Session Video Recordings

The video recordings of the participants' research sessions were initially coded according to the observable on-screen actions. The coding scheme for the on-screen actions came from a previous study of online information-seeking (Hider, 2005), which the researcher adapted to the context of legal information-seeking (see Appendix E). The codes for the on-screen actions were also timestamped to facilitate matching with the think-aloud protocols. This resulted in a chronological list of on-screen actions, which were timestamped according to their temporal location within the video.

The final step involved bringing together the think-aloud protocols and the chronological list of on-screen actions into one document for each participant. To accomplish this, the thought units in the think-aloud protocols were matched with the on-screen actions from the video recordings using the timestamps that had been recorded for both. This process resulted in a table containing the timestamped thought units from the think-aloud protocols alongside the corresponding on-screen actions from the video recordings. A sample from one of these tables can be found in Appendix F.

Interview Recordings

The audio recordings of the participants' interviews were transcribed in the same way as the recordings of the think-alouds. Trint was used first to produce a rough machine-generated transcript, and then, the researcher made manual corrections to produce accurate verbatim transcripts.

Analysis of Cognitive Processes

The think-aloud protocols were the primary data sources used to analyze the participants' cognitive processes. In addition, the lists of on-screen actions from the

research session videos were used to supplement and enhance the researcher's understanding and interpretation of the think-aloud protocols.

A general inductive approach to qualitative analysis was employed to analyze the think-aloud protocols (Thomas, 2003). This approach was selected because it allows one to condense extensive raw textual data into summary format, and to establish clear links between the research questions and the summary findings derived from the raw data (Thomas, 2003).

The analysis of the think-aloud protocols involved two stages: open coding and building themes.

Open Coding

The open coding began with a preliminary exploratory analysis, in which the think-aloud transcripts and the interviews were read closely to gain a general understanding of the data as a whole (Clark & Creswell, 2015). The think-aloud protocols were then divided into thought units based on meaningful pieces of information that could be understood without the help of any additional context (Lincoln & Guba, 1985, p. 345). After the transcripts were unitized, the thought units were coded at a fine-grained level based on the participants' cognitive processes (Clark & Creswell, 2015). For example, the following unit was coded as *recognizing a familiar case*: "Antrim Truck ... this seems like a case I've read before. However, I know it's not necessarily a blocking view case. This is more of a public private nuisance case." The next stage of open coding involved a process of constant comparison (Glaser & Strauss, 1967) where thought units and codes were compared for similarities and differences. Codes that were found to be similar were grouped into categories to reduce redundancy (Clark & Creswell, 2015). A

definition was also written for each code to ensure that all codes were, in fact, distinguishable from one another.

The initial list of codes for cognitive processes contained over 70 codes (see Appendix G), which was refined to 33 codes after several rounds of comparison and grouping.

Building Themes

The second phase of analysis consisted of developing themes out of the coded data (Clark & Creswell, 2015). The themes were built by grouping similar codes together to form a major idea about the central phenomenon (Clark & Creswell, 2015). For example, the categories *summarizing the law, paraphrasing the judge's reasoning, interpreting the task objectives or parameters, summarizing key points of a case, and comparing major elements of a case*, were grouped together under the major theme, *Understanding*.

During the theme-building stage, it appeared that the major categories emerging from the codes aligned with the cognitive processes found in Bloom's Revised Taxonomy of Cognitive Processes (Anderson & Krathwohl, 2001). To confirm this hunch, the researcher arranged the codes under the headings in Bloom's and found that most of them fit the taxonomy. Thus, the theme-building phase of analysis resulted in the identification of the following over-arching categories of cognitive processes:

- *Remembering,*
- *Understanding,*
- *Applying,*
- *Analyzing,*

- *Evaluating*, and
- *Creating*.

In addition to grouping the codes according to the cognitive processes in Bloom's, the researcher also found that the codes could be grouped along the dimension of knowledge type. Knowledge type is defined as the type of knowledge that is being acted upon or created by the participant (Anderson & Krathwohl, 2001). The three knowledge types that were identified from the codes were as follows:

- *Knowledge of the Law*,
- *Legal Research Knowledge*, and
- *Metacognitive Knowledge*.

The initial list of 33 codes from the open coding were retained as distinct sub-categories within the over-arching categories of cognitive processes and knowledge types. This resulted in the Taxonomy of Cognitive Processes in Online Legal Research (see Table 4).

Memos were produced during all stages of coding. Memo-writing provided a record of the researcher's interpretations of the data as it evolved throughout the analytic process (Clark & Creswell, 2015). As an example, the following memo describes some initial thoughts about the knowledge type dimension:

I am becoming more intrigued with the idea of distinguishing between cognitive processes that happen in the arena of research and ones that happen in the arena of solving the legal problem. My gut feeling based on the first three transcripts is that there is a lot more attention being given to the higher-level processing

happening around solving the substance of the problem, and much less attention to the lower-level processing happening around the research.

Appendix H presents a sample of memos written during the analysis.

Analysis of Research Behaviours

The primary data sources used to analyze the behaviors were the on-screen actions from the video recordings of the participants' research sessions and the think-aloud protocols.

Research behaviours were determined by the presence of both an observable action on the video recording as well as an intention to achieve a goal that would move the research project forward. For example, the action of scrolling down the computer screen would not have been coded as an information-seeking behaviour in itself; however, when interpreted considering the underlying intention, it could be coded as one of several online research behaviours such as *scanning*, *skimming*, or *close reading*.

One way that an intention could be determined was through the think-aloud protocols that accompanied the on-screen actions. For example, during one instance of scrolling down the computer screen, the participant said, "I am scanning through this document looking for a particular idea." Thus, this segment of the think-aloud protocol and corresponding on-screen actions was coded as *scanning*.

Another way that intention could be determined was through the context in which the on-screen action occurred. For example, a participant may have expressed in the think-aloud protocol that they were planning to spend more time understanding the details of a case. Soon after, the video recording may have shown a case being opened

and scrolled through slowly. Based on what was said and what happened beforehand, this slow scrolling action would have been coded as *deep reading*.

The open coding stage of analysis produced an initial list of 23 codes. These codes were grouped together during the theme-building phase to produce the following list of three major categories of research behaviours:

- *Information-seeking*,
- *Reading*, and
- *Notetaking*.

The initial list of 23 codes were retained as distinct sub-categories of behaviour within the major categories. This resulted in a set of themes for behaviours during online legal research (see Table 8).

Establishing Trustworthiness

It is important to include procedures that establish validity, credibility, and trustworthiness in qualitative research studies. According to Creswell and Miller (2000), research conducted in the post-positivist paradigm can benefit from the inclusion of validity procedures such as triangulation and the creation of an audit trail.

Triangulation is defined as the “search for convergence among multiple and different sources of information to form themes or categories” (Creswell & Miller, 2000, p. 126). The use of triangulation contributes to research validity by eliminating researcher bias and increasing the truthfulness of propositions (Golafshani, 2003). This study employed triangulation across data sources (i.e., participants) and triangulation across methods (i.e., interviews, video recordings of research sessions, and think-aloud protocols).

An audit trail is one of the most important techniques for establishing trustworthiness in naturalistic research as it allows an external audience to examine both the process and the product of the inquiry (Lincoln & Guba, 1985). Keeping an audit trail requires the researcher to keep “clear documentation of all research decisions and activities” (Creswell & Miller, 2000, p. 128). An audit trail was established in the current study through a Journal of Research Activities throughout the data collection and analysis. Samples from this journal can be found in Appendix I.

Finally, as this study involved human subjects, research ethics approval was obtained from the Queen’s University General Research Ethics Board. A copy of the research ethics clearance letter can be found in Appendix A.

Chapter 4

Findings and Discussion

As previously described, the purpose of this study was to gain an in-depth understanding of law students' online legal research processes. To study these research processes, two questions were asked: (1) what cognitive processes do law students employ as they conduct online legal research, and (2) what research behaviours do law students perform when conducting online legal research? This section has been organized so that each research question is presented separately, each with its own findings and discussion. This structure has been employed because each of the research questions generated a distinct set of themes that warranted a separate presentation. A general discussion at the end of this section ties together the themes from both research questions and discusses the educational and research implications.

Research Question #1: What Cognitive Processes do Law Students Employ as they Conduct Online Legal Research?

The findings in this section represent the participants' cognitive processes while conducting online legal research. These findings are organized into a detailed taxonomy that resulted from the analysis, as shown below in Table 4. The taxonomy consists of six major types of cognitive processes, 33 sub-types of cognitive processes, and three knowledge types. The major types of cognitive processes are general processes that coincide with the cognitive processes identified in Bloom's Revised Taxonomy of Cognitive Processes (Anderson & Krathwohl, 2001): remember, understand, apply, analyze, evaluate, and create (see Table 5). The sub-types of cognitive processes are more

specific to the online legal research task and represent the specific cognitive processes that the participants employed in the current study.

Table 4

Taxonomy of Cognitive Processes in Online Legal Research

Major Type of Cognitive Processes	Subtypes of Cognitive Processes	Knowledge Types
Remember	Retrieve relevant prior knowledge	L, LR
	Recognize a familiar case	L
	Recognize a familiar legal research tool	LR
Understand	Summarize the law	L
	Paraphrase judge's reasoning	L
	Compare major elements of cases	L
	Summarize key points in a case	L
	Interpret the objectives of the assigned task	L, LR
Apply	Identify a relevant research strategy or resource	LR
	Implement a research process or search procedure	LR
	Execute a search technique	LR
	Identify a relevant subject area	L, LR
	Focus on the task at hand	M
	Check for missing information	M
	Prepare for an oral presentation	M
	Prioritize tasks	M
	Monitor progress on task	M
	Monitor time	M
	Monitor volume of information	M
Analyze	Reason by analogy	L
	Identify elements of a case	L
	Select a relevant definition	L
	Select a relevant statement of the law	L
	Select relevant keywords from a document	L, LR
Evaluate	Evaluate the relevance of a document or case	L
	Decide to use a document or case	L
	Evaluate the relevance of search results	L, LR
	Evaluate a source	L, LR

	Evaluate the success of a research strategy	LR
	Identifying a gap in one's knowledge	M
Create	Synthesize the law	L
	Construct an argument	L
	Plan advice to client	L

Key: L = knowledge of the law, LR = legal research knowledge, M = metacognitive knowledge

Table 5
Cognitive Processes from Bloom's Revised Taxonomy of Educational Objectives

Cognitive Process	Description
1. Remember	Retrieve relevant knowledge from long-term memory
2. Understand	Construct meaning from oral, written, or graphic communication
3. Apply	Carry out or use a procedure in relation to a task
4. Analyze	Break material into its constituent parts and determine how the parts relate to one another and to an overall structure or purpose
5. Evaluate	Make judgments based on criteria and standards
6. Create	Put elements together to form a coherent or functional whole

Note: From Anderson & Krathwohl, 2001

The knowledge types shown in the Taxonomy of Cognitive Processes in Online Legal Research in Table 4 represent the types of knowledge that were activated during the participants' online legal research sessions. Each sub-type of cognitive process in the taxonomy has one or more knowledge types associated with it. The knowledge types represent knowledge that is specific to the context of online legal research (see Table 7). However, they also map onto and overlap with the knowledge types in Bloom's Revised Taxonomy (Anderson & Krathwohl, 2001) (see Table 6). For example, *Knowledge of the*

Law maps onto Bloom’s factual knowledge because it incorporates knowledge of the basic elements that law students must know to be acquainted with the law, such as knowledge of the roles of parties in a case (e.g., plaintiff, defendant, and so on) or knowledge of court names. *Knowledge of the Law* also maps onto Bloom’s conceptual knowledge because it includes knowledge of legal concepts such as nuisance and other legal principles. It also maps onto Bloom’s procedural knowledge because it incorporates knowledge of methods of legal analysis and problem-solving.

Similarly, *Legal Research Knowledge* maps onto Bloom’s factual, conceptual, and procedural knowledge types. *Legal Research Knowledge* incorporates knowledge of sources of the law and legal information (factual knowledge), how these information sources are connected to one another (conceptual knowledge), and when and how to use these sources (procedural knowledge).

Table 6

Knowledge Types from Bloom’s Revised Taxonomy of Educational Objectives

Knowledge Type	Description
1. Factual Knowledge	The basic elements students must know to be acquainted with a discipline or solve problems in it
2. Conceptual Knowledge	The interrelationships among the basic elements within a larger structure that enable them to function together
3. Procedural Knowledge	How to do something, methods of inquiry, and criteria for using skills, algorithms, techniques, and methods
4. Metacognitive Knowledge	Knowledge of cognition in general as well as awareness and knowledge of one’s own cognition

Note: From Anderson & Krathwohl, 2001

Table 7

Knowledge Types in Online Legal Research

Knowledge Type	Description
1. Knowledge of the Law	Substantive knowledge of the law and legal systems, as well as knowledge of legal concepts and knowledge of legal analysis and legal problem-solving approaches
2. Legal Research Knowledge	Knowledge of the legal research process, and knowledge of legal research tools, strategies, search tactics, or legal citation
3. Metacognitive Knowledge	Knowledge of cognition in general as well as awareness and knowledge of one's own cognition

Categories of Cognitive Processes

This section describes each of the major cognitive processes found in the study as these cognitive processes were determined to be the most relevant ones in relation to online legal research. Examples of some of the sub-types of cognitive processes are also provided, along with quotes from participants that illustrate those processes. The examples also illustrate the different knowledge types that were acted upon in each category.

Remembering

Remembering is defined as “retrieving relevant knowledge from long-term memory” (Anderson & Krathwohl, 2001, p. 31). The major cognitive process of *Remembering* was found to work on the knowledge types of *Knowledge of the Law* and *Legal Research Knowledge*.

In the context of the current study, *Remembering* captured several sub-types of cognitive processes, one of which was *recognizing a familiar case*. For example, at minute 16:17, participant E had already found three cases, but he was doubting their strength as legal authorities. As a result, he decided to conduct another keyword search to

look for a case that he recognized from class. While observing himself review the results of his search, he commented,

...and then I find Smith v Inco and that jumps out immediately as a case I've done. So, I am happy, this is one of the cases that I remember had to deal with blocking view. In my mind, I remember thinking this is great, this is probably a stronger authority than the cases I have.

This example also shows the major cognitive process of *Remembering* working on the knowledge type of *Knowledge of the Law* because the content of the process pertains to the participant's substantive knowledge of a legal case.

Another example of the major cognitive process *Remembering* is the cognitive process sub-type *recognizing a familiar legal research tool*. For example, at minute 22:17, participant E decided to re-double his efforts to find an authority from Ontario, which until that point had eluded him. After failing to find an Ontario case in the citing references for *Becze v Edmonton*, participant E returned to the WestlawNext homepage and opened the link to the Canadian Encyclopedic Digest. Observing this, he commented, "Let's go back to the CED which is always kind of the first place I start with. It helps, it's broad, and it is kind of always a great way to look..." This example shows that when an obstacle is encountered during the legal research process, law students will draw upon their prior knowledge of legal research tools and strategies to help move the process forward. Furthermore, this example shows that *Remembering* can act on the knowledge type of *Legal Research Knowledge* because the substance of the comment pertains to the CED, which is a legal research tool.

Understanding

Understanding is defined as “constructing meaning from oral, written, or graphic communication” (Anderson & Krathwohl, 2001, p.31). Examples of the major cognitive process *Understanding* were found in relation to the knowledge types of *Knowledge of the Law* and *Legal Research Knowledge*.

One of the first instances of *Understanding* to occur in several of the participants’ think-aloud protocols happened when participants engaged in the cognitive process of *interpreting the task parameters and/or objectives*. For example, while observing herself highlighting information in the task document at minute 0:41, participant D stated:

And then I highlighted what I was asked to do by the client which was looking for legal advice specifically related to nuisance law. So, then I kind of highlighted the area of law that I can narrow into in my research. And then finally I highlighted what my principal asked me to do so I knew what my final objective was when I was going into doing the research.

This quote demonstrates that participant D was careful to understand the research task before proceeding with the research, and it is a good example of the major cognitive process *Understanding*. The example also shows that the major cognitive process *Understanding* can work on the knowledge type of *Legal Research Knowledge* because the content of the process pertained to the nature of the legal research task.

Another sub-type of *Understanding* that occurred quite frequently throughout the transcripts was *summarizing key points of a case*. Transcripts were coded as *summarizing key points of a case* when the participant’s actions and comments indicated that they were summarizing key aspects of a case such as its facts, reasoning, legal remedy, and so on.

For example, while observing herself read *White v LeBlanc* and write notes, participant A observed:

I'm just noting that as a result of the obstruction of the view there was a withdraw of the purchase of the property. I thought this is important because then it could have some remedies perhaps in ... damages to show that they lost out of an opportunity. Just noting that. And then there was another promise made to move the trailer, so then the people agreed to purchase. I'm just trying to keep track of the facts because it's a little bit of a complicated problem and I think there's multiple areas for claims in this case, so I just wanted to keep them straight.

This example shows that participant A summarized key points of a complicated case to help her understand what happened in the case. It also demonstrates that the major cognitive process of *Understanding* can work on the knowledge type of *Knowledge of the Law* because the comment pertains to understanding the substance of a legal case.

Applying

Applying is defined as “carrying out or using a procedure in relation to a task” (Anderson & Krathwohl, 2001, p.31). The cognitive process of applying was found to work on *Legal Research Knowledge* and *Metacognitive Knowledge*.

Most of the participants engaged in the cognitive process of *executing a search technique or procedure*, which is a sub-type of the major cognitive process *Applying*. *Executing a search technique or procedure* occurred when a participant performed an action within the database interface to locate some desired information. Examples included instances where participants conducted a keyword search in the general search box; browsed a table of contents or index; applied a filter to their search results; or

broadened the keywords used in a search query. For example, at minute 20:12, participant E found that the keyword search he had performed was retrieving too many results. To improve the accuracy of his search results, he applied a database search filter for the jurisdiction Ontario, which narrowed down his results considerably. His comments while observing this action on-screen indicate his intention:

View itself is clearly far too broad a word, so let's try this ... let's try to maintain an Ontario case. Scroll down here and limit to Ontario [clicks Ontario filter]. 166 returns. That's not too bad. We can deal with that.

This example shows how participants applied their knowledge of the online legal research tool by executing a search technique - in this case applying a search filter - to improve the accuracy of their search results. It also shows that the cognitive process of *Applying* can work upon *Legal Research Knowledge* because it pertains to knowledge about how to search for information in a legal database.

All participants also engaged in the cognitive process of *checking for missing information*, which is another sub-type of the major cognitive process *Applying*. *Checking for missing information* occurred when a participant read or re-read a document or a set of search results to make sure that a relevant piece of information had not been missed. For example, approximately halfway through her research session, participant D opened the task document and reread it. Observing this action, she commented, "I basically reread the main facts just to make sure I wasn't missing any instructions or anything major that I was supposed to do." This example of checking for missing information demonstrates the application of the metacognitive knowledge that sometimes one must reread something to accurately extract the required information for the task.

Thus, it provides an example of the major cognitive process *Applying* acting in relation to *Metacognitive Knowledge*.

Analyzing

Analyzing is defined as “breaking material into its constituent parts to determine how the parts relate to one another and to an overall structure or purpose” (Anderson & Krathwohl, 2001, p.31). The cognitive process of *Analyzing* was found to work on the knowledge types of *Knowledge of the Law* and *Legal Research Knowledge*.

All participants engaged in the cognitive process of *reasoning by analogy*, which is a sub-type of the major cognitive process of *Analyzing*. *Reasoning by analogy* is defined in this study as comparing the facts of two or more cases and finding that they share meaningful significant attributes (Romantz & Elliott Vinson, 2009), or that their meaningful significant attributes are distinguishable from one another. For example, while reading the case *White v LeBlanc*, participant D commented:

Here the context was clearly unreasonable because the person did it just to get back at their neighbor, where in the case at hand I didn't really see the conduct as being as unreasonable because there was no malicious intent. So, I thought it was a really important distinguishing factor because although this case had come to a different conclusion there was this clear difference.

This example shows that participants engaged in the process of *reasoning by analogy* when comparing the facts of the cases they found with the facts of the legal research problem they were given. It also shows that the cognitive process *Analyzing* can work on the knowledge type of *Knowledge of the Law* because the comment pertains to the substance of a legal case.

Another example of *Analysing* could be found when participants engaged in *selecting relevant keywords*. The cognitive process sub-type *selecting relevant keywords* occurred when participants selected potentially relevant keywords from the task document to use for searching within the WestlawNext database. *Selecting relevant keywords* was found to work on the knowledge types of *Knowledge of the Law* and *Legal Research Knowledge* simultaneously because it required both an understanding of the legal substance of the fact scenario as well as an understanding of how legal documents are classified within WestlawNext. For example, after reviewing the task document, participant A remarked, "...jurisdiction is Ontario, keyword might be nuisance...yeah keywords, so interference with reasonable enjoyment...I know that's a common phrase, so I was just writing that down." Shortly after this, she typed the keyword 'nuisance' into the WestlawNext search box to search for relevant cases.

Evaluating

Evaluating is defined as "making judgments based on criteria and standards" (Anderson & Krathwohl, 2001, p.31). The cognitive process of *Evaluating* was found to work on all three knowledge types.

One of the most frequently used cognitive processes for all participants was *evaluating the relevance of a document*. *Evaluating the relevance of a document* occurred when participants assessed the potential suitability of a document for inclusion in the final research product. This assessment was based on factors such as analogousness of facts, relevance of the outcomes, year of decision, jurisdiction, level of court, and the strength of the authority. For example, while reading *Webster v Lowe*, participant B

debated about whether to use it in his final research product. The following remarks shows him evaluating the relevance of the document and eventually coming to a decision:

Should I find another case? No, this is still good because it shows us what we have to avoid. We have to avoid telling the person to move it and if they move it then our case isn't so strong. I thought it was relevant even though it's not specifically what we want - the outcomes are not good. It's good to keep it in mind to know what to avoid.

This example shows that the cognitive process *Evaluating* can work on the knowledge type of *Knowledge of the Law* because the example pertained to the content of a legal case.

Another example of *Evaluating* occurred when participants evaluated the success of their research strategies. *Evaluating researching strategies* means assessing the effectiveness of a research strategy in retrieving desired information. For example, after running a keyword search using the search query “nuisance view”, participant E commented, “This nuisance view search wasn't really getting great results. So, let's go back to our original keywords - blocking view. View itself is clearly far too broad of a word.” This example also shows that the cognitive process *Evaluating* can work on the knowledge type of *Legal Research Knowledge* because it pertained to the content of a search query that the participant had constructed in the WestlawNext search engine.

A third example of *Evaluating* occurred when participants identified a gap in their knowledge. The cognitive process of *identifying a gap in knowledge* occurred when participants realized that they lacked some knowledge that was pertinent to successfully completing the task. For example, while observing herself open links to topics within the

Canadian Encyclopedic Digest, participant C commented, “I think I’m just looking at general nuisance issues and what exactly nuisance is because I’m not super familiar with that.” This comment implies that participant C was aware that she lacked knowledge about the legal concept ‘nuisance’ and that she was trying to remediate this lack of knowledge through consulting a secondary source. Thus, the cognitive process of *identifying a gap in knowledge* is an example of the major cognitive process of *Evaluating* because it implies that one has evaluated one’s own knowledge level. This example also shows that *Evaluating* can work on the knowledge type of *Metacognitive Knowledge* because it pertains to awareness of one’s own knowledge level (Anderson & Krathwohl, 2001).

Creating

Creating is defined as “putting elements together to form a coherent or functional whole” (Anderson & Krathwohl, 2001, p. 31). The major cognitive process of *Creating* was found to work on the knowledge type of *Knowledge of the Law*.

An example of *Creating* occurred when participants synthesized the law. The cognitive process sub-type of *synthesizing the law* involved binding together various authorities into a whole description that states a rule of law. This was a creative process because it involved synthesizing information to create something new. For example, between minutes 17:30 – 18:30, participant E intensively edited his research notes. His comments reveal the creative process that was occurring:

Let's just put Strachan cited within Edmonton and these cases can kind of be lumped together in that they're connected in that way. And then, kind of final nail

in the coffin, we have an Ontario case here that I believe speaks on the matter, case that I recognize... this will just make it stronger.

This example shows that the major cognitive process *Creating* can work on the knowledge type of *Knowledge of the Law* because the example showed the participant combining rules from different legal cases to form a coherent picture of the current state of the law pertaining to the topic in the research problem.

Discussion of Findings on Cognitive Processes

This study generated a detailed taxonomy of cognitive processes that occurred during law students' online legal research processes. The taxonomy mirrors Bloom's Revised Taxonomy in the major processes that are identified as central to the online legal research process. Like Bloom's, the taxonomy in the current study also finds that the cognitive processes can act on several different knowledge types, although the knowledge types that were identified in the current study differ slightly from those in Bloom's. In particular, the knowledge types of *Legal Research Knowledge* and *Knowledge of the Law* were identified separately because they are distinct but complementary knowledge bases, and legal research instructors may find it useful to think of them separately when designing learning objectives and learning exercises.

The taxonomy also provides empirical support for the cognitive processes proposed in Callister's Adapted Bloom's Taxonomy for Legal Research (2010). Although the structure of the taxonomy in the current study is slightly different from the structure of Callister's taxonomy, most of the key cognitive processes described by Callister are present in the current taxonomy, including remembering, understanding, application, analysis, synthesis, and metacognition. The only cognitive process in

Callister's taxonomy that did not come out in the current study was concluding.

However, this could be explained by the fact that the research task in the current study simply required participants to locate three relevant documents and not to generate a conclusion from their research.

This study also offers empirical evidence that law students engage in higher level cognitive processes during online legal research. Some of the higher-level cognitive processes that were observed in the current study were also identified in the review of the literature as being critical to the online legal research process. These include (a) evaluating and selecting relevant legal information (Butler, 2002; Harker, 2013; Wheeler, 2011); (b) creating a research plan and reflecting on research processes (Valentine, 2009); and, (c) applying metacognitive skills to the online legal research process (Callister, 2010; Harker, 2013; Niedringhaus, 2010). Each of these cognitive processes played an important role in the online research processes in the context of the current study.

In the current study, all participants spent considerable time evaluating the cases and documents that they came across in WestlawNext to determine their potential relevance for the legal problem. Such instances were classified under the cognitive process sub-type *evaluating the relevance of a document or case* within the taxonomy. Generally, participants were not satisfied to simply select documents from a list of search results based upon the presence of relevant keywords. More often, participants would open the documents, skim, and sometimes closely read certain sections to pull out specific pieces of information such as key facts, legal issues, year of the decision, jurisdiction, and level of court. For example, after conducting an initial keyword search in

the Westlaw Database for the words ‘nuisance view’, participant A opened several of the cases from the search results list and examined them closely. While observing this behaviour, she remarked:

...just trying to look at some of the facts.... I think I like the definitions defining nuisance, the thresholds, and the tests.... I think I'm just reading.... I wanted to make sure this is the most relevant one and I saw that it's Supreme Court and 2013.

This example demonstrates how participants read and analyzed parts of the cases they found at the point of viewing the database search results to determine their potential relevance for inclusion in the final product. This is consistent with previous observations made by legal research instructors and law librarians that law students must rely heavily on their own analytical skills to evaluate the relevance of legal information that they find in the online environment (Butler, 2002; Wheeler, 2011).

Creating a research plan is also considered to be a critical cognitive process during online legal research (Valentine, 2009). Although none of the participants in the current study created a full-fledged research plan before entering the Westlaw database, some participants showed signs of having planned out some aspects of their research process before entering the Westlaw database. This usually consisted of identifying a potentially relevant area of law to begin their research or identifying a particular resource that would be useful to start with (classified as *identifying a relevant subject area* or *identifying a relevant research strategy or resource* in the taxonomy). For example, after having read the research task at the start of the research session, Participant D explained:

I kind of highlighted the area of law that I can narrow into in my research.... And then I went to Westlaw and since I knew I was going into Nuisance, I started directly with the Canadian Encyclopedic Digest because I thought this would be a good first step to go through the research.

It is possible that none of the participants created fully articulated research plans because of the very short time allowed for the research task. Alternatively, there could be a tendency among law students to skip the research planning stage and dive right into online searching. More empirical research, perhaps in the context of a more extended legal research task is needed to determine whether law students are apt to engage in planning before conducting online legal research.

Finally, several authors have argued that metacognitive skills are becoming increasingly important in the era of digital legal research, specifically the ability to articulate when and where to use specific research strategies and to reflect on the success of those strategies (Callister, 2010; Harker, 2013; Niedringhaus, 2010). There was some evidence of these processes taking place in the current study when, for instance, some of the participants articulated their reasons for consulting a particular resource like the Canadian Encyclopedic Digest. For example, near the beginning of the research session, participant A stated, “I saw the CED and thought it might put the rule out to me.” Similarly, participant E opened the CED near the end of his research session, explaining “...it helps, it’s broad, and it’s always a great way to look...let’s see if there’s anything I missed ‘because I didn’t go through the CED before.” The ability to articulate when and where to use specific types of resources is essential in the digital legal research environment because of the plethora of available information sources and paths from

which to choose. In both instances, the participants intentionally chose to consult a resource that was designed to serve the information need that they had articulated, thereby demonstrating the application of metacognitive skills during the research process.

The cognitive process of reflecting on the success of research strategies could also be found in the current study, providing further evidence for the importance of metacognitive skills in the context of online legal research (Callister, 2010; Harker, 2013; Niedringhaus, 2010). These processes were usually classified under the cognitive process sub-type *evaluating the success of a research strategy* within the taxonomy. For example, part way through her research session, participant D reflected on her research strategy as follows: “I was pretty comfortable at that point with the three cases that I had chosen because starting from the CED I thought that it had given me a pretty broad overview of the law. It had highlighted the major cases and then looking at these cases I was pretty confident that they were dealing with the same issues that I had.” Some participants also reflected on the success of specific search tactics, such as the construction of a search query or the application of filters to search results. For example, participant E decided that his search query needed to be adjusted after noticing that the search results it had generated were too broad. In both examples, the process of reflecting on search strategies was an important metacognitive process that either confirmed the success of a particular research strategy or pointed to the need to learn and/or adjust.

Research Question #2: What Research Behaviours do Law Students Perform when Conducting Online Legal Research?

The findings in this section represent the behaviours and actions that the study participants performed while conducting the online legal research task. Three major

themes emerged from the analysis: (a) *Information-seeking*, (b) *Reading*, and (c) *Notetaking*. Table 8 provides a brief description for each one. Each of these themes and pertinent behaviours are discussed in greater detail below.

Table 8

Online Legal Research Behaviours Themes

Theme	Description
1. Information-seeking	Interactions with the legal database to find information
2. Reading	Reading a document such as a case, a secondary source, a statute, the research task document, or one's research notes
3. Notetaking	Writing or copying/pasting text into the research notes document

Information-Seeking

In the current study, the major theme *Information-seeking* referred to any behaviours in which participants interacted with the legal database to find information. Participants' on-screen actions from the video recordings and their thought units from the think-aloud protocols were classified through the data analysis into six behaviours pertaining to the theme *Information-seeking*: (a) *browsing*, (b) *chaining*, (c) *consulting secondary sources*, (d) *searching*, (e) *updating research*, and (f) *using finding tools*. Figure 1 presents the behaviours pertaining to this theme. Some information-seeking behaviours were considerably more or less prevalent than others during the research sessions, and for this reason, frequency counts for each of the behaviours are shown below in Table 9.

Theme 1: Information-seeking

1. Browsing
2. Chaining
 - a. Following cited references
 - b. Following citing references
3. Consulting secondary sources
4. Searching
 - a. Conducting a keyword search
 - b. Conducting a search for a document name or citation
 - c. Editing a search query
 - d. Filtering search results
 - e. Using search commands or Boolean operators
5. Updating research
 - a. Checking the appeal history of a case
 - b. Checking the subsequent judicial treatment of a case
6. Using finding tools

Figure 2

Behaviours Pertaining to Theme 1: Information-seeking

Table 9

Information-seeking Behaviours and Frequency Counts

Behaviour	Frequency Count
Browsing	9
Chaining	14
Consulting secondary sources	18
Searching	39
Updating research	15
Using finding tools	1

Browsing

Browsing referred to looking through an organized knowledge structure such as an index or table of contents to a) identify relevant documents, or b) to explore topics that may be relevant.

For example, participant A opened the Land Titles Act and scrolled through the table of contents to identify additional relevant documents during the last few minutes of her research session. While viewing this action, she commented “Here I was looking for

anything about nuisance or your right to reasonable enjoyment of your property anything like that. So, I'm just looking for any kind of keywords that would make me think of that.” This quote demonstrates an intention to identify relevant documents through browsing. Similarly, while scrolling through the table of contents for the Nuisance section of the Canadian Encyclopedic Digest, participant D commented, “From there I kind of scrolled down the headings looking for something to do with either blocked vision or loss of sight. And I did find a specific area to do with loss of view.”

Participant C browsed through the CED to explore topics that may be relevant to the research problem early on in her research session. As she scrolled through table of contents for the Torts section of the CED, she made the following remarks:

I'm kind of looking at things that... I mean it could be an invasion of privacy issue. I'm also clicking into things I don't know the meaning of...appropriation of personality – not sure what that is. Champerty – not sure what that is. But, it could a nuisance issue, so I'm kind of clicking into those. Interference with domestic relations might be an issue as well....

Chaining

Chaining referred to the behaviour of consulting a relevant document to find additional citations to other potentially relevant documents. It encompassed the sub-behaviour of *following cited references*, which refers to the behaviour of mining the footnotes and references of a relevant document for additional relevant citations. It also encompassed the sub-behaviour of *following citing references*, which means using a citator tool to locate potentially relevant documents that have subsequently cited a document.

An example of *chaining* could be found when participant D consulted the footnotes in the Canadian Encyclopedic Digest, and then clicked the linked citations to open several additional relevant cases. This was an example of the chaining sub-behaviour *following cited references*. The following comment illustrates her intention to locate relevant cases using the *following cited references* approach, "...then I went back to the CED and basically opened up the cases that were referenced within the CED that had dealt with the loss of view."

Consulting a Secondary Source

Consulting a secondary source occurred when a participant consulted a legal encyclopedia, textbook, or other secondary source to (a) gain an understanding of the relevant legal rules and principles, (b) identify relevant keywords, or (c) identify relevant cases.

For example, near the beginning of her research session, participant C opened the Canadian Encyclopedic Digest to the section on 'Nuisance'. Her comments reveal that her intention was to gain an understanding of the relevant legal rules and principles in the research task. At minute 7:43, she made the following remark, "Okay, here we go. So, the general principles which is exactly what I've been looking for all along."

Participant A consulted the CED at different points in her research session to gain an understanding of the relevant legal rules, but also to identify relevant keywords and cases. At minute 8:04, she explained that she was consulting the CED because she thought "...it might put the rule out to me." At minute 25:44, she returned to the same section of the CED to "make sure I didn't miss anything in terms of keywords or cases or any other resources."

Searching

Searching meant entering one or more search terms into a search box within the WestlawNext Canada interface to find relevant documents. The search terms could be words related to the substance of the problem (*conducting a keyword search*), or words that were contained in the title of a known document (*conducting a search for a document name or citation*). *Searching* encompassed both entering the keywords into the search box and scanning through the search results to locate relevant documents. It also included related sub-behaviours directed towards improving the results of a keyword search such as *editing a search query*, *filtering search results*, and *using search commands* such as quotation marks.

For example, to find relevant documents, most of the participants conducted at least one topical keyword search. For example, participant E conducted a topical keyword search early on in his research session “to see if there’s any direct analogous cases that will pop up from the go.” Participant D conducted a topical keyword search later in her research session “to see were there any cases which the CED hadn’t cited which would either come up since that case or after that I could pull on.”

In addition, many of the participants engaged in behaviours, such as *editing search results* and *filtering search results*, that were meant to improve the results of their search queries. For example, participants A and E both edited the words in their initial search queries to either broaden or narrow their search results. After running an initial search query of ‘nuisance blocking view’, participant E commented that “...nothing is coming up. I don’t know, I’m going deeper into the research and I’m almost narrowing it

too much.” In the next moment, he changed his search query to ‘blocked view’ and remarked “...let’s go back to our original search.”

Several of the participants used search filters to narrow the results of their searches. For example, participant A applied the jurisdiction filter to her search results at minute 29:35 and remarked, “narrowing it by Ontario.” Participant D applied a subject filter to her search results at minute 20:31 and said, “Then I went down and narrowed my subject area to just torts because I wanted torts cases dealing with nuisance.” Both participants’ comments illustrate an intention to narrow search results by applying search filters.

Updating Research

Updating research referred to the behaviour of consulting specialized updating research tools to confirm that a case is still authoritative. It encompassed two related sub-behaviours: (a) *checking the appeal history of a case*, and (b) *checking the subsequent judicial treatment of a case*.

For example, to determine if the case she had found was still authoritative, participant D looked at the subsequent judicial treatment of the case using the KeyCite tool in WestlawNext. After opening the case, she clicked the citing references tab in the KeyCite tool and commented, “And then I opened Webster and Lowe again just to see if it had been cited in anything else, and what I saw is it only had been cited basically in the CED and that’s where I had originally got to it from. So that was no big deal.” She then added the case to her research notes, which indicated that she did not find a problem with the authoritativeness of the case that she had found.

Using Finding Tools

Using finding tools referred to consulting a legal research finding tool to locate relevant documents. A legal research finding tool is a tertiary source that indexes and consolidates primary and secondary legal sources. In WestlawNext, the Canadian Abridgment Case Digests (CACD) is the primary finding tool that digests and categorizes Canadian case law by topic.

Participant C was the only participant to use the CACD during her research session to locate relevant documents. At minute 2:39, she opened a link to the CACD from the WestlawNext homepage, and at minute 5:36 she spent about twenty seconds scanning a page of case digests in the Nuisance section. She commented, “there are cases that aren’t super helpful at this point so early. There’s so many cases.” Although her intention was to locate some relevant cases, the outcome of her attempt to use the Canadian Abridgment was not successful. She did not return to the Canadian Abridgment again during her research session.

Reading

This theme encompassed instances where the participants read documents they had retrieved from the legal database. *Reading* broadly referred to any time spent reading a specific document such as a case, a secondary source, a statute, the research task document, or one’s research notes. Within the broad theme of *Reading*, three behaviours were identified: (a) *scanning*, (b) *skimming*, and (c) *close reading*. Figure 2 presents the behaviours pertaining to the theme of *Reading*.

<p>Theme 2: Reading</p> <ol style="list-style-type: none">1. Scanning2. Skimming3. Close reading

Figure 3

Behaviours Pertaining to Theme 2: Reading

Scanning

Scanning referred to the action of reading quickly through a document to look for specific information such as a definition, an answer to a known question, or a keyword. All participants opened and scanned several of the documents in the search results to identify potentially relevant cases. For example, participant A briefly scanned several cases in a list of search results to locate key facts and keywords that would help her to determine if the cases the search engine had returned were relevant. Her comment at minute 6:15 illustrated her intention to locate specific information within the cases: “This is another one. Same thing looking at the keywords and the key topics of law. See if it’s relevant. Reading that there’s some of the facts I thought were pretty applicable in this one.”

Skimming

Skimming referred to the action of reading to generally familiarize oneself with or 'get the gist' of a document. All participants engaged in this reading behaviour at some point during their research session. For some participants, skimming the headnotes of a case (the case summary at the top of the case document) allowed them to determine how closely related the case was to the legal problem they had been given and whether to spend time reading the case more closely. For example, participant C opened a great number of documents during her research session and for many of them spent only a brief amount of time looking at each one. While observing this behaviour at minute 21:42, she commented:

I'm kind of skimming. Instead of reading the case I'm looking at the headnotes because that can give you a good sense of kind of what the case is about and how ... I'm considering potentially reading it but then thinking no because it's too much at this point. Just trying to see...

Similarly, after opening one of the cases she had found, participant A commented:

I started off at the headnote and it gave a broad summary of the case. I was able to see whether or not it was related. This one did seem like it was related, and it was unique in that it came to a different conclusion than the previous two cases which I cited, which I thought was important because it showed that the law wasn't 100% completely settled. So, skimming the headnote basically gave me that information and pointed me that it was important.

Close Reading

Close reading referred to the action of careful reading of a document or section of a document to understand its details and nuances. All five participants engaged in close reading at different points during their research sessions. *Close reading* often occurred as participants read the task document at the beginning of the research session. For example, in the first minute of his research session, participant E opened the task document and explained:

Obviously the first thing we need to do is read through the facts. Sometimes I'll get in the habit of seeing keywords and trying to jump ahead. So, I try and make sure that I'm reading every single thing. Small things that I would easily miss like the part about the front windows. While it may not seem like a relevant fact for now who knows.

In other words, this participant was reading the research task document closely to ensure that he understood and remembered all the relevant pieces of information.

In addition, *close reading* was associated with a desire to understand the content of a document at a deeper level and to analyze and apply certain aspects of cases. *Close reading* was often employed later in the research process and concurrently with periods of intensive notetaking. For example, after opening a case and scanning it for relevant citations, participant D slowed down her scrolling and took some time to look at a specific section of the case. At minute 12:45 she explained:

When I got to the court's analysis of this case, I really dove in to try and see what they were saying and what they had relied on in order to say that this was a nuisance, and what I saw here was that there had really been malfeasance, like a negative poor conduct on the part of the other party.... So, I copy and pasted this one line from the judgement because here the court is basically putting a lot of importance about the reasonableness of one's conduct vis-a-vis their neighbor.... where in the case at hand I didn't really see the conduct as being as unreasonable because there was no malicious intent. [writes something down in her research notes document] I thought it was a really important distinguishing factor because although this case had come to a different conclusion there was this clear difference.

In the example above, *close reading* results in the identification of a specific quote from the case that can be directly applied to the legal problem in the research task.

Notetaking

This theme encompassed instances where the participants wrote or copy/pasted something into their research notes document. Three behaviours were identified within the theme of *Notetaking*: (a) *recording*, (b) *formatting and editing*, and (c) *writing*. Figure 3 presents the behaviours pertaining to this theme.

<p>Theme 3: Notetaking</p> <ol style="list-style-type: none">1. Recording2. Formatting and editing3. Writing

Figure 4

Behaviours Pertaining to Theme 3: Notetaking

Recording

Recording referred to recording a piece of information verbatim either by copy/paste or typing.

All five participants copied and pasted title and citation information from the relevant documents they had found into their research notes. Participant D expressed the intention behind copy and pasting a case citation at minute 11:14 when she said, “I copy and pasted part of the citations to my notes so that way I'd have that to refer to if I ever lost track of that case.” In addition, all participants copied and pasted sections of the text from cases they had found into their research notes. The content of what was recorded varied and included things like key facts from case headnotes, definitions of key terms, and quotations from written judgments.

Formatting and Editing

Formatting and editing referred to any action that improved the logic, organization, and/or clarity of the research notes, or made their appearance look more professional. It included actions such as adding bullet points, moving paragraphs or

sentences to different locations, highlighting specific words or phrases, adding headings, or changing font size or style. It also included the related behaviour of fixing typographic or grammatical errors.

For example, participant D moved some of her bullet points at minutes 19:21 – 19:31 to improve the logic and organization of her notes. Her intention is illustrated by the comment, “I just cleaned up my notes to make that explanation kind of run smoother if I needed to do it.” Similarly, participant C indicated her intention to bring clarity to her research notes by highlighting the phrase ‘loss of view’ in her research notes at minute 20:26 and remarking that it was “the primary thing we are looking at.”

Writing

Writing meant writing down one’s own ideas or the ideas of another in one’s own words.

Most of the participants wrote notes summarizing, comparing, and analyzing the facts of the cases they had found. For example, after writing some notes down, participant D commented, “I also just typed in a brief summary of the facts, so that way if I was asked about the case and how it was related, I would be able to make that comparison.” A few minutes later, watching herself make some more notes, she said, “I basically made note that here there was a successful action in nuisance for the same kind of idea - the loss of sight, where in the case at hand I didn't really see the conduct as being as unreasonable because there was no malicious intent.”

Some of the participants also wrote notes about their own evaluations of the relevance of cases they had found for the legal problem in the research task. For example, after writing down some notes, participant A commented, “I was just adding some

additional notes about how you could use this case as kind of a precedent. And I was just noting that it's really fact specific so it might not apply exactly especially because this seems to just be an exception.”

Discussion of Findings on Online Legal Research Behaviours

This study revealed three high-level themes related to law students' online legal research behaviours: (a) *Information-seeking*, (b) *Reading*, and (c) *Notetaking*. This section will interpret and discuss each of these themes in turn.

In the current study, the theme of *Information-seeking* contained six distinct behaviours. These behaviours were *browsing*, *chaining*, *consulting secondary sources*, *searching*, *updating research*, and *using finding tools*. Several of these behaviours (specifically, *searching*, *browsing*, *chaining*, and *updating research*) were consistent with the online information-seeking behaviours observed among academic lawyers in a previous study (Makri et al., 2008). This finding makes sense given that the participants in Makri et al. (2008) used the American legal research databases Westlaw and LexisNexis Professional, which share similar features and research tools with the Canadian WestlawNext database used in the current study.

Some information-seeking behaviours occurred far more frequently than others in the current study. *Searching*, and the related sub-behaviours of *editing a search query* and *filtering search results*, were by far the most prevalent of the information-seeking behaviours observed. This finding lends further support to the notion that law students generally prefer keyword searching over other types of online information-seeking behaviour such as browsing organized knowledge structures (Eaton, 2010; Krieger & Kuh, 2014).

Consulting secondary sources was a less prominent behaviour than *searching*, although it still occurred somewhat frequently. Four of the five participants consulted a secondary source at some point during their research sessions, and three of the participants consulted a secondary source near the very beginning of their research sessions. This behaviour was consistent with the direction given in legal research checklists to start legal research with secondary sources (see Lederman Law Library's *Legal Research Checklist*, guides.library.queensu.ca/legal-research-checklist). In addition, the examples in the Findings section above show that the participants consulted secondary sources for the purposes of developing a better understanding of the law and identifying relevant keywords and cases, which are consistent with the reasons identified by legal research experts in the review of the literature (Eaton, 2010; Harker, 2013; Krieger & Kuh, 2014; McKenzie & Vaughn, 2011).

Several of the participants also performed the information-seeking behaviour of *updating research* during their research sessions. *Updating research* has been identified by legal research educators as a key step in the legal research process because it allows one to discover changes and new developments in the law which are relevant for the legal problem being worked on (see Lederman Law Library's *Legal Research Checklist*, guides.library.queensu.ca/legal-research-checklist). Several of the participants expressed this justification for updating research during their think-alouds. For example, when participant A used the WestlawNext updating tool, KeyCite she explained that she wanted to see "whether there had been a change in the law which had expanded the scope of loss of sight."

Browsing occurred occasionally during the participants' research sessions, but it was far rarer than many of the other types of information-seeking behaviours. *Browsing* was often performed for the purpose of exploring a topic and to identify potentially relevant documents. In these instances, the purpose of the participants' browsing behaviour corresponded with the justifications given by educators in the literature on online legal research, such as re-creating missing context (McKenzie & Vaughn, 2011) and reducing information overload (Meyer, 2016).

The information-seeking behaviour that appeared the least number of times in this study was *using finding tools*. In Canadian legal publishing, the pre-eminent case law finding tool is the Canadian Abridgment Case Digests (CACD). The CACD originated well before the era of the Internet, although it is now electronically available on WestlawNext. Only one of the participants attempted to use the CACD during her research session, and as described in the Findings section above, she found it difficult to use and quickly gave up on it. This finding is consistent with the findings of a previous study in which law students found the CACD "cumbersome and unwieldy to use" (Peoples, 2005, p. 672). However, there may be another force at play, which is the way in which the CACD is integrated into the functionality and interface of WestlawNext. As mentioned previously, the CACD is not included in the search results from the federated search tool, and the link to the CACD sits near the bottom of the Westlaw homepage where it is less likely to be noticed. This weak integration of the CACD with the rest of WestlawNext may partially explain why law students are not using this valuable research tool.

In addition to the information-seeking behaviours discussed above, two additional broad themes of research behaviour were identified in the participants' online legal research processes. The first of these themes was *Reading*, which included the sub-behaviours of *skimming*, *scanning*, and *close reading*. *Reading* pervaded the participants' research sessions, and as described in the findings section above, different reading strategies were used for different purposes. Meyer (2016) argues for the inclusion of "basic legal reading literacy" in legal research course curricula including deep reading skills and knowing when to scan and skim text. The findings of the current study lend support to this idea by showing that different types of reading play key roles at different times and for different reasons in the online legal research process.

Finally, *Notetaking* was included as a theme of online legal research behaviour in the current study because like *Reading*, *Notetaking* was a highly prevalent behaviour during the participants' online research sessions. The topic of notetaking in legal research textbooks often takes the form of instruction on how to write case briefs (McCarney et al., 2019). A case brief is a summary or synopsis of a judge's written decision, which can take the form of a short case synopsis or a more detailed case summation (McCarney et al., 2019). Both the short and long case briefs follow a format or model such as IRAC (Issue, Rule, Application, Conclusion) or FILAC (Facts, Issues, Law, Application, Conclusion) (Fitzgerald, 2016; McCarney et al., 2019). Short case briefs are effective tools to prepare for class discussion and exams whereas the more expansive case briefs are viewed as appropriate for summarizing the law when working on complex research assignments (McCarney et al., 2019). Most of the participants in the current study organized their research notes by case, and under each case heading, they included

information that generally conformed with the content from the IRAC or FILAC models (facts, legal issues, rule, application, and conclusion). However, none of the participants explicitly used the IRAC and FILAC headings to organize their notes. Furthermore, some participants simply copied and pasted relevant parts of the case headnotes into their research notes, whereas other participants summarized the relevant parts of the cases in their own words.

Another type of notetaking that is frequently taught by law librarians is to record one's research path (Hazelton, Roebuck Jarrett, McMurrer, & Whisner, 1996; McCormack et al., 2015). Law students are advised to do this so that they can keep track of the sources they have checked and avoid duplication of effort later (especially relevant for legal research projects that take place over several days or weeks). A popular template for recording the sources one has consulted during the legal research process can be found in McCormack et al.'s legal research textbook, *The Practical Guide to Canadian Legal Research* (2015). The participants in the current study did not appear to take systematic notes on their research paths, but rather recorded only the cases and documents that they had decided were relevant to share with their principals. This may have been because they were restricted to using a blank Word document for their notetaking and did not have access to a form for recording their research paths. Another possibility is that participants may not have believed it was necessary to systematically record the sources they consulted because the research task was of a short duration and was not performed in a real-life context.

General Discussion

The purpose of this study was to explore law students' experiences as they conducted online legal research to solve a legal problem. The findings provided a richly detailed qualitative account of law students' cognitive processes and research behaviours while conducting online legal research.

With respect to cognitive processes, this study presented a detailed taxonomy of cognitive processes in online legal research that was grounded in Bloom's Revised Taxonomy of Educational Objectives (Anderson & Krathwohl, 2001). Callister (2010) proposed that an adapted version of Bloom's Taxonomy could provide an effective model for developing a legal research curriculum. The current study empirically supports this view by showing that the cognitive processes during online legal research mapped onto Bloom's taxonomy in a clear and logical fashion.

Furthermore, this study provided empirical support that law students engage in the higher level cognitive processes that legal research educators and law librarians have identified as being essential in the online legal research environment, namely, evaluating and selecting relevant legal information (Butler, 2002; Harker, 2013; Wheeler, 2011); creating a research plan and reflecting on research processes (Valentine, 2009); and applying metacognitive skills (Callister, 2010; Harker, 2013; Niedringhaus, 2010). In addition, the current study organizes these processes along with other relevant processes into a comprehensive and analytical framework.

With respect to online legal research behaviours, the current study found six information-seeking behaviours that were used by law students during their research sessions, several of which corresponded with those previously identified by Makri et al.

(2008). Of these behaviours, *searching* was by far the most prevalent behaviour, confirming prior observations about law students' preferences for keyword searching over other types of online research behaviour (Eaton, 2010; Krieger & Kuh, 2014). In contrast, the behaviours of *browsing* and *using finding tools* were observed very infrequently, also confirming the findings of prior research and in-class observations (Eaton, 2010; Krieger & Kuh, 2014).

Finally, this study showed that *Reading* and *Notetaking* were prevalent throughout the participants' online legal research sessions. As such, these two behaviours were interpreted as playing an important role during online legal research. This conclusion opens the door to further studies into reading and notetaking behaviours during online legal research. It also suggests that there may be additional relevant and important research behaviours in other legal research contexts such as professional environments that have not yet been identified. The remainder of this thesis outlines the study limitations and practical implications.

Study Limitations

In this study, there were some limitations that may have impacted the findings. First, the study involved asking students to conduct only one very specific research task, whereas there are a variety of research tasks that students may be asked to perform in the law school context. For example, law students might be asked to perform research to produce a legal memorandum, a legal factum, or write a research essay. This study also examined the experiences of law students only, whereas online legal research is conducted by lawyers, paralegals, and law librarians in professional settings as well. This

study was not able to capture all the cognitive processes and research behaviours in these various contexts.

Secondly, there was an artificially imposed time limit on the legal research task as well as an artificially imposed restriction to not use any other resources, print or online, besides WestlawNext. This was done for logistical reasons to simplify data gathering. However, this may have altered the way that participants engaged with the research task. For example, when asked if they would have done anything differently if the same task were performed under 'normal' conditions, some of the participants responded that they would have taken more time on the task, and some indicated that they would have talked to other people such as friends, teachers, or librarians. All participants indicated they would have used additional search tools beyond Westlaw, with Google being the most frequently mentioned tool. Other tools that were mentioned were Quicklaw, CanLII, YouTube, and Google Scholar.

Finally, the study was a qualitative research project that produced rich data with direct quotes from participants. This allowed for an in-depth understanding of the central phenomenon of online legal research that could inform future research in this area of study. However, as with all studies with a small sample size (n=5), the generalizability of the findings is limited to the specific context in which the study occurred.

Practical Implications

The findings of this study have implications for educators in the field of legal research instruction, as well as for law librarians and vendors of law search tools. The implications, which are described below, are organized according to the findings for each of the research questions.

Implications of Findings on Cognitive Processes

The Taxonomy of Cognitive Processes in Online Legal Research (see Table 4) developed in this study could be used by educators and law librarians to help students develop online legal research skills. For example, the taxonomy could assist with the creation of learning objectives, assignments, and rubrics for assessment. The use of the taxonomy would benefit instructors and law librarians because it allows different cognitive processes and knowledge types to be assessed separately and independently of one another. This would allow instructors and law librarians to focus on skills that need further development. For example, a student might have strong analytic skills and possess a solid understanding of the law, but if they do not know how to construct an effective search query in a legal database, or if they are lacking time management skills, their success in performing legal research tasks will be hampered. The taxonomy would allow these nuances to become apparent and provide an opportunity for specific skills to be improved. Furthermore, the taxonomy could be used to coordinate teaching and assessment of research skills between law librarians and legal research instructors. Law librarians could introduce specific research skills during classroom sessions, as well as during reference interviews, and legal research instructors could incorporate assessment of these research skills into course assignments.

The taxonomy also suggests an approach to legal research instruction that includes not only database search strategies and the accrual of substantive legal knowledge, but also metacognitive skills. Metacognitive skills have been identified as a missing piece in legal research curricula by experts in the field of legal research instruction (Callister, 2010; Harker, 2013; Niedringhaus, 2010). Niedringhaus (2010)

argues that teaching metacognitive skills to law students in the context of legal research instruction would help them to become more efficient and effective legal researchers. This in turn would help them to make a more successful transition from the classroom to the law firm when they graduate. The metacognitive knowledge dimension in the taxonomy could support the inclusion of metacognitive skills in legal research instruction.

Implications of Findings on Online Legal Research Behaviours

The findings of this study provide insights into the research behaviours that law students engage in when conducting online legal research. These findings could inform the ongoing development of instruction, support tools, and prompts to help students conduct online legal research more effectively. For example, law librarians might enhance existing legal research checklists to illustrate the process of legal research more clearly, perhaps by using visual aids and diagrams. Law librarians might also consider highlighting secondary sources that are useful starting points for novice legal researchers within online library research guides.

Given that participants engaged in the behaviours of *browsing* and *using finding tools* infrequently during their online research sessions, law librarians and legal research instructors could provide further instruction and support in these areas. For example, more emphasis could be placed on the Canadian Abridgment Case Digests (CACD) within introductory legal research courses, and librarians could create online documentation and/or tutorials on how to use this tool effectively. Furthermore, vendors of legal research databases could consider re-designing their landing pages to place greater emphasis on secondary sources and finding tools such as the CACD.

The research behaviours observed in this study included not only information-seeking behaviours, but also extended periods of reading and notetaking. This knowledge could inform the expansion of legal research curricula to include enhanced instruction in these areas. For example, the study's findings show that notetaking is a key component in the online legal information-seeking process; thus, legal research instructors and law librarians could provide explicit instruction on how to take notes effectively in an online legal research environment and/or develop an enhanced notetaking template for online legal research that students could use. Vendors of law search tools could also consider how to better integrate online notetaking during the research process. The study's findings also show that different kinds of reading such as scanning, skimming, and close reading are used at different points during online legal research. Therefore, specific instruction could be designed around the development of skills in each of these reading styles, and when to use them for maximum efficiency.

Future Directions

The findings of the current study suggest several possible directions for further research. First, further research could be undertaken to test whether the findings of this study hold true in other online legal research contexts and to discover if any additional cognitive processes and research behaviours are relevant during online legal research. For example, the same research questions and think-aloud methodology could be used to examine law students' online legal research in the context of a course assignment such as a memorandum or factum, or in the context of a work assignment at a law school legal clinic or law firm. The online legal research processes of different user groups, such as practicing lawyers, law librarians, and academic lawyers, could also be studied to

determine if their research behaviours and cognitive processes differ from those of law students. Moreover, additional research could be undertaken to examine whether the Taxonomy of Cognitive Processes in Online Legal Research (see Table 4) that emerged from this study could be used to effectively inform the development of learning objectives and assessments for legal research instruction. Research of this nature may also identify if further developments or refinements of the taxonomy are needed.

Second, one could expand the scope of the current study and utilize the timestamps from the Camtasia recordings to examine the times at which different research behaviours and cognitive processes occurred during the research sessions. An investigation of this sort could potentially reveal one or more temporal patterns of research behaviour and cognitive processing during online legal research. This kind of information could help legal research instructors, law librarians, and vendors of legal research tools to map common patterns during online legal research and develop prompts or supports to help students navigate their way through the research process successfully.

Third, the findings of this study showed that notetaking occurred extensively throughout the participants' online legal research sessions. A study of notetaking practices within higher education found that information assimilation in online research and learning environments has become more complex and challenging for students (Reimer, et al., 2009). Digital notetaking tools and applications have been proposed and developed to alleviate some of the challenges of digital notetaking (Mosleh, et al., 2016; Reimer et al., 2009). One possible direction for future research could be to examine more closely the notetaking practices of law students and lawyers within the context of online legal research to determine (a) what specific challenges law students and lawyers face

when trying to assimilate legal information from multiple resources found in online environments, (b) whether current notetaking practices are sufficient to meet the challenges of information assimilation in online research environments, and (c) whether digital notetaking practices, templates, or tools could be re-purposed or developed to assist with notetaking during online legal research.

Lastly, this study found reading to be a pervasive behaviour throughout participants' online research sessions. Three types of reading were identified during the research sessions: scanning, skimming, and close reading. A fourth type of reading that may impact online legal research outcomes is reading that occurs in the context of navigating the database interface itself. The methods used in the current study did not allow for systematic observation of this type of reading. However, in a future study, one could gather eye-tracking data to examine how law students and/or lawyers read and navigate the interfaces of online legal research tools, and to study the relationship between the reading that occurs on digital legal research interfaces and the outcomes of the legal research process.

Chapter 5

Conclusion

In recent years, legal research tools have transformed from being print-based tools to largely online research tools. This has created a need to better understand how online tools affect the legal research experience. This research study aimed to establish an in-depth understanding of law students' online legal research processes. Specifically, using the virtual revisit think-aloud method, the study examined cognitive processes and research behaviours that occurred while law students conducted an online legal research task.

The study's findings produced a detailed taxonomy of cognitive processes during online legal research. In addition, empirical evidence was found showing that law students engage in higher level cognitive processes previously identified by legal research educators and law librarians as critical for success in online legal research. These processes included evaluating and selecting relevant legal information, creating a research plan, reflecting on research processes, and applying metacognitive skills. The study also identified several information-seeking behaviours used by law students during their research sessions. In line with prior studies and observations, *searching* was found to be the most prevalent information-seeking behaviour, while *browsing* and *using finding tools* occurred far less frequently. In addition, this study identified *Notetaking* and *Reading* as key online legal research behaviours, which have not yet been accounted for in behavioural models of legal research. As discussed in the previous chapter, these findings offer contributions to the literature for understanding both the cognitive processes and research behaviours that occur during online legal research.

The overall findings of this study suggest that the online environment has an impact on the cognitive processes and research behaviours in which law students engage while conducting legal research. These findings have provided direct insights into the cognitive processes and research behaviours that occur in this context. This information can contribute to the ongoing development of high-quality legal research courses and instruction. It can also inform the work of law librarians in their continuing development of support tools and prompts to help law students conduct online legal research effectively. Finally, if law librarians and legal research instructors provide feedback to legal database developers based on the findings of this study and others like it, improvements can be made to the design of online legal research tools to better support novice legal researchers.

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Appendices

Appendix A: General Research Ethics Board Clearance Letter



I

February 21, 2019

Ms. Leslie Taylor
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Queen's University
511 Union Street West
Kingston, ON, K7M 5R7

GREB Ref #: GEDUC-943-19; TRAQ # 6025781
Title: "GEDUC-943-19 An Exploration of the Cognitive, Emotional and Behavioural Dimensions of Law Students' Online Legal Research Processes"

Dear Ms. Taylor:

The General Research Ethics Board (GREB), by means of a delegated board review, has cleared your proposal entitled "GEDUC-943-19 An Exploration of the Cognitive, Emotional and Behavioural Dimensions of Law Students' Online Legal Research Processes" for ethical compliance with the Tri-Council Guidelines (TCPS 2 (2014)) and Queen's ethics policies. In accordance with the Tri-Council Guidelines (Article 6.14) and Standard Operating Procedures (405.001), your project has been cleared for one year. You are reminded of your obligation to submit an annual renewal form prior to the annual renewal due date (access this form at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Annual Renewal/Closure Form for Cleared Studies"). Please note that when your research project is completed, you need to submit an Annual Renewal/Closure Form in Romeo/traq indicating that the project is 'completed' so that the file can be closed. This should be submitted at the time of completion; there is no need to wait until the annual renewal due date.

You are reminded of your obligation to advise the GREB of any adverse event(s) that occur during this one-year period (access this form at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Adverse Event Form"). An adverse event includes, but is not limited to, a complaint, a change or unexpected event that alters the level of risk for the researcher or participants or situation that requires a substantial change in approach to a participant(s). You are also advised that all adverse events must be reported to the GREB within 48 hours.

You are also reminded that all changes that might affect human participants must be cleared by the GREB. For example, you must report changes to the level of risk, applicant characteristics, and implementation of new procedures. To submit an amendment form, access the application by at <http://www.queensu.ca/traq/signon.html>; click on "Events;" under "Create New Event" click on "General Research Ethics Board Request for the Amendment of Approved Studies." Once submitted, these changes will automatically be sent to the Ethics Coordinator, Ms. Gail Irving, at University Research Services for further review and clearance by the GREB or Chair, GREB.

On behalf of the General Research Ethics Board, I wish you continued success in your research.

Sincerely,

A handwritten signature in blue ink, appearing to read "Dean Tripp".

Dean Tripp, Ph.D.
Chair
General Research Ethics Board

c: Dr. Pamela Beach, Supervisor
Dr. Pamela Beach, Chair, Unit REB
Mrs. Erin Rennie, Dept. Admin.

Appendix B: Demographic Questionnaire

1. Please type your identification code below. The code is contained in the email that directed you to this survey.

2. What is your age-range?

20-25 years

26-30 years

31-35 years

36-40 years

41-45 years

46-50 years

51-55 years

56+ years

3. What year of the JD program are you currently in?

1L 2L 3L

4. Have you taken or are you currently taking the course Introduction to Legal Skills?

Yes No

5. What practice skills courses have you taken that required you to conduct legal research? Please check all that apply.

Advanced Legal Research (LAW 321)

Alternative Dispute Resolution (LAW 341/342/343/344/345)

Canadian Labour & Employment Law Journal (LAW 581/582)

Prison Law Clinic (LAW 418AB)

Clinical Externship (CALC, KCLC, NCLC) (LAW 698AB)

Clinical Litigation Practice (LAW 590AB)
Collective Agreement Arbitration (LAW 562)
Family and Children's Law Placements (LAW 521)
Queen's Family Law Clinic (LAW 527)
Federal Government Internship (LAW 699)
Queen's Elder Law Clinic (LAW 695AB)
Negotiation (LAW 335/336/338)
Queen's Business Law Clinic (LAW 438AB)
Queens Law Journal (LAW – 587/588/589AB)

6. What other courses have you taken where you conducted legal research? Please list the courses, and briefly describe the nature of the legal research assignments.
7. What other experiences have you had that required you to conduct legal research? Examples could include things like jobs, volunteer placements, participating in a competitive moot, etc. Please list all that apply.
8. What database(s) do you prefer to use to conduct Canadian legal research? Please rank them in order of preference (with 1 being most preferred, 2 being second most preferred, and so on...)

WestlawNext Canada

Lexis Quicklaw Advance

CanLII

Google

Other (please specify)

9. Have you received WestlawNext Canada database training?

Yes No

10. Have you used the WestlawNext Canada database in the past twelve months?

Yes No

11. How frequently do you use WestlawNext Canada for legal research?

1	2	3	4	5
Never	Once a Year	Once a Month	Once a Week	Several times per week

12. Please rate your level of agreement with the following statement: *I am confident that I can conduct legal research successfully to solve a legal problem.*

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neither Agree nor Disagree	Moderately Agree	Strongly Agree

13. Please rate your level of agreement with the following statement: *I am comfortable using the Internet.*

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neither Agree nor Disagree	Moderately Agree	Strongly Agree

14. Please rate your level of agreement with the following statement: *I am confident in my ability to use WestlawNext Canada to conduct legal research.*

1	2	3	4	5
Strongly Disagree	Moderately Disagree	Neither Agree nor Disagree	Moderately Agree	Strongly Agree

Appendix C: Step-by-Step Data Collection Procedure

Step 1: Introduction (5 min)

The researcher restates the purpose of the research and reviews the letter of information and consent form with the participant.

Step 2: Legal Research Task (40 minutes)

Step 2 a. The researcher reads the following instructions to the participant:

I am going to give you a legal research task to work on. The full instructions for the task are on the computer in a Word document that is open at the bottom of the screen. I want you to use Westlaw and only Westlaw to conduct the research for this task. Please do not use any other databases or online sources. If you wish to take any notes as you work on this task, please record your notes in Microsoft Word. There is an open Word document on your computer that you can use for this purpose. You will have up to half-an-hour to work on this task. I will be coming back in the room at the fifteen-minute point to ask you to fill out a brief questionnaire. Then, I will return again when the half hour is done. Do you have any questions before you begin?

Before getting started, I would like you to read the research task and then fill out a brief questionnaire.

After the participant is finished reading the research task, the researcher gives them the emotions questionnaire to fill out. Before leaving the room, the researcher starts the Camtasia recording, and tells the participant what time it is and what time she will return.

Step 2 b. The participant does the research task. The researcher is out of the room while the participant is working on the task.

Step 2 c. At the fifteen-minute point, the researcher returns to the room and asks the participant to fill out the emotions questionnaire. The researcher pauses the recording while the participant is filling out the questionnaire. When the participant has completed the questionnaire, the researcher resumes the Camtasia recording and leaves the room.

Step 2 d. At the end of thirty minutes, the researcher returns to the room and asks the participant to stop doing the task. After the participant stops doing the task, the researcher says to the participant, “*Please tell me briefly about the documents you chose and why you chose them.*” After the participant has answered this question, the researcher stops the Camtasia recording.

Step 2 e. Following the participant’s verbal summary of his or her chosen documents, the researcher asks the participant to fill out the emotions questionnaire.

Step 3: Virtual Revisit Think-aloud Practice Session (10 minutes)

Step 3 a. The researcher reads the following instructions to the participant:

In this study, I am interested in what you think about as you conduct online research to solve a legal problem. In order to do this, I am going to ask you to think-aloud while viewing a recording of your online research session. Before you view the recording of your session, we’re going to do a brief practice of the think-aloud technique using a different research task. For the practice session, I’d like you to spend a couple of minutes in Westlaw searching for cases where someone has brought a guide dog into a bar. When you are finished, I will play back the recording for you and ask you to practice thinking aloud.

Step 3 b. The researcher starts a new Camtasia recording. The participant does the research task. The participant has three minutes to work on the task, then the researcher asks them to stop. The researcher stops the Camtasia recording.

Step 3 c. The researcher reads the following instructions to the participant:

I'm going to play back what you did and ask you to think-aloud while viewing the recording. What I mean by think-aloud is that I want you to tell me everything that you were thinking from the time you began the research task until you finished it. I would like you to talk aloud constantly. I don't want you to try to plan out what you say or try to explain to me what you are saying. Just act as if you are alone in the room speaking to yourself. It is most important that you keep talking. I will prompt you to continue talking if you pause for more than 30 seconds.

Step 3 d. The researcher plays back the recording of the practice task to the participant, and the participant thinks aloud while viewing the recording. Here is a list of possible corrective feedback remarks (there could be others) the researcher may say to the participant while they are doing the practice think-aloud:

- *Speak to yourself as though you are alone in the room; try not to direct the speech to me.*
- *Try to verbalize the thoughts you were having, rather than simply describing the actions on the screen.*
- *Try speaking in the present tense.*
- *Try not to evaluate or judge what you did.*

The researcher asks the participant to stop thinking aloud when the participant seems to have mastered the technique.

Step 4: Virtual Revisit Think-aloud (30 minutes)

Step 4 a. The researcher reads the following instructions to the participant:

Now I am going to play back a recording of the other legal research task. I would like you to think-aloud while viewing the recording in the same way that you just did with the guide dog task.

Step 4 b. The researcher starts a new Camtasia recording. The participant does the virtual revisit think-aloud while viewing the recording of the main legal research task. The researcher sits beside the participant so that she can observe and listen to the participant in order to ask follow-up questions at the end of the think-aloud.

Step 5: Post-Think-aloud Interview (10 minutes):

After the think-aloud session is complete, the researcher conducts a semi-structured interview with the participant. The researcher will use the following questions as a guide:

- 1. How would you describe your emotional experience in relation to the research task? What emotions did you feel at the beginning of the task? How did those emotions change as you progressed through the task? What emotions did you feel at the end of the task?*
- 2. The researcher may ask probing questions about cognitive processes that occurred during the research task which were not fully explored during the think-aloud – e.g., what was your thought process as you did X during the research task?*
- 3. What were the three major challenges or obstacles that you experienced as you worked on the legal research task?*

4. *For each of the challenges you listed, if you could have gone back in time, what help would have been useful?*
5. *On a scale of 0 – 5, how would you rate your prior knowledge of the topic of nuisance prior to completing today’s research task?*

0	1	2	3	4	5
None	Limited	Basic	Proficient	Advanced	Expert

6. *On a scale of 0 – 5, how comfortable were you with thinking aloud?*

0	1	2	3	4	5
Not at all	Slightly	Somewhat	Quite a bit	Very much	Extremely

If the participant answers Not at all, Slightly, or Somewhat, then ask them to elaborate on why they found it that way. In other words, probe to find out why it was not an entirely comfortable experience.

7. *If you had been doing this research task under “normal conditions”, i.e., without the time constraint and the instruction to use Westlaw exclusively, would you have done anything differently?*
- a. *Would you have started the task in a different way?*
 - b. *Would you have taken any additional steps?*
 - c. *Would you have used different sources?*
 - d. *Would you have looked for any help outside of Westlaw?*
 - e. *Would have you have tracked and organized the information you collected in a different way?*

Step 6: Closing (2 min)

The researcher thanks the participant and gives them a \$30 gift card for their contribution. The researcher also asks the participant's permission to contact them later to share preliminary findings and ask for their comments (member checking). The researcher stops the Camtasia recording.

Appendix D: Research Task

Mr. Arnold owns a house in the picturesque neighbourhood of Sunny Acres, Kingston, which is located on the shores of Lake Ontario. From the large front windows of Mr. Arnold's house one can take in a lovely view of Goose Bay. Mr. Arnold's neighbours from across the street, Mr. and Mrs. Barnes, recently purchased a 40-foot Winnebago motorhome, which they have parked on their property beside their house. Unfortunately, they have parked the motorhome in a location that happens to be directly across the road from Mr. Arnold's front window. Mr. Arnold is very upset because the motorhome blocks his treasured view of the lake and he has asked his neighbours several times if they could park it elsewhere, but they have refused. Mr. Arnold is now seeking legal advice regarding whether or not the parked motorhome might give rise to an action based on nuisance against Mr. and Mrs. Barnes.

Your principal has asked you to find some preliminary information that might assist her in advising Mr. Arnold. She is leaving the office to catch a train in half-an-hour, and she would like to be able to review the information you have located while she is on the train. By the end of the half hour, she would like you to give her a short list of two or three potentially relevant documents, along with a brief verbal explanation of why you chose them.

You have in front of you a computer workstation with WestlawNext and an open Word document. Please use only WestlawNext to conduct the legal research for this task. Please record any notes you wish to take on the open Word document.

Appendix E: Coding Scheme for Online Legal Research Actions (Adapted from Hider, 2005)

The following codes to be entered on a separate line:	
Start	start of session, indicated by start of recording
End	end of session, indicated by end of recording
Pause	substantial pause in session, where no screen movement shown
+	opens application/new window
&	tiles windows
=	closes some of screen's windows, when tiled/reduced
%	scrolls down/up in a browsing manner
s/f	saves into file
#n	displays full record/resource of n (n = number on list)
Note	writes a note in the research notes document
Format	formats research notes by changing font, spacing, alignment, etc.
---	moves cursor over text in a reading manner
Edit	edits research notes (e.g., deletes text, makes grammatical or stylistic changes, etc.)
The following codes to be entered as strings on a single line, where applicable:	
b	goes back to previous screen in window (e.g., using browser's Back button)
f	goes forward to next screen in window (e.g., using browser's Forward button)
The following codes to stand alongside a description of resulting screen's contents:	
Ω	closes screen window
=>	switches to another window, or fully opens a window when tiled/reduced (to be used with one of the following codes or description of page): TD = task document RN = research notes WL = WestlawNext
(abc) →	clicks on link or menu option (abc = link label)
(abc) =>	clicks on link and opens in a new tab (abc = link label)
p/q	pastes as query
rc	right click
Sort by	(criteria such as relevance, date, etc.)
The following codes to stand alongside a description of target content:	
x	Checks
ux	unchecks a preselected option
c	copies text
p	pastes text in research notes

h	highlights text
b	adds bold formatting to text
d	deletes text
q (abc)	inputs query into IR system (abc = search box label)
edit q (abc)	edits search query (abc = search box label)
Delete q (abc)	deletes search query (abc = search box label)
~	Drags
Ctrl +f	Uses Control +F to search a document for a specific term
>	Moves to next instance of search term in document
>>	Clicks through several instances of search terms in the document in quick succession
Filter (abc)	Applies filter to search results (abc=filter label)
Description of resulting screen's content may include:	
	title of webpage
	name of search engine/database
	title of source, e.g., CED, citing references
	number of results obtained, e.g., 0, 7, 169.
	citation numbers displayed, e.g., 1- 10, 11 – 20
Miscellaneous codes:	
DT	Desktop
WLHP	WestlawNext home page
X	broken link
&&	screen redraw interrupted by another action

**Appendix F: Sample from a Timestamped Think-Aloud Protocol with
Corresponding On-Screen Actions (Participant Y5L2)**

Timespan	Content	Action timespan	Action code	Description of content
0:10.0 - 0:16.0	So as I'm going through kind of looking for okay what's the general area of law here			
0:16.0 - 0:20.0	and pretty right away I mean you see owner, house, picturesque neighborhood, neighbors	00:53	%	TD
0:20.0 - 0:28.0	and immediately your mind almost jumps to nuisance and property at a larger scope.	00:58 – 01:02	%	TD
0:28.0 - 0:33.0	So this kind of starts [garbled] I mean a lot of the facts this is something I haven't really seen necessarily before in terms of a motor home.	01:06	c	text from TD
0:33.0 - 0:37.0	But that's where we start.	01:10	=>	RN
0:37.0 - 0:41.0	So cutting and paste the exact instructions I always try and do that.	01:11 01:12	p Note	text from TD

Appendix G: Initial List of Categories for Coding Cognitive Processes

Potential Categories for Coding

1. Brainstorming
2. Comparing cases
3. Constructing arguments
4. Deciding to use a document
5. Drawing from prior knowledge
6. Evaluating a search query
7. Evaluating relevance of a document
8. Evaluating relevance of a set of documents
9. Evaluating the state of my knowledge
10. Formulating a search query
11. Identifying a potential research direction
12. Identifying a relevant area of law
13. Identifying a relevant case or cases
14. Identifying a relevant definition
15. Identifying a relevant statement of the law
16. Identifying a remedy
17. Identifying a starting point
18. Identifying case holding
19. Identifying cited or citing sources
20. Identifying judge's order
21. Identifying jurisdiction
22. Identifying legal issues
23. Identifying level of court
24. Identifying relevant chapter heading
25. Identifying relevant facts
26. Identifying relevant keywords
27. Identifying settled points of law
28. Identifying task objective or parameters
29. Identifying year of decision
30. Looking casually
31. Looking for a familiar case
32. Looking for a legal remedy
33. Looking for a more authoritative precedent
34. Looking for additional sources
35. Looking for applicable statutes
36. Looking for distinguishing cases
37. Looking for ideas
39. Looking for relevant chapter headings
40. Looking for relevant facts

41. Looking for relevant keywords
 42. Looking for something that might have been missed
 43. Looking for support for an idea
 44. Looking for the big picture
 45. Looking for the outcome of the case
 46. Looking out of interest
 47. Making a decision about research direction
 48. Making an assumption
 49. Making connections
 50. Noticing something useful
 51. Noticing time
 52. Organizing notes
 53. Planning advice to client
 54. Planning next steps
 55. Planning research strategy
 56. Practicing verbal presentation
 57. Preparing for presentation
 58. Problem-solving
 59. Proofreading
 60. Reading
 61. Reasoning by analogy
 62. Recognizing a familiar case
 63. Reflecting on research findings
 64. Reflecting on the research process
 65. Reflection or synthesis
 66. Reviewing prior cases
 67. Reviewing research notes
 68. Reviewing task
 69. Scanning
 70. Seeing the big picture
 71. Skimming
 72. Summarizing relevant parts of a case
 73. Synthesizing ideas
 74. Trying to keep track of complicated facts
 75. Trying to stay focused
 76. Understanding the judge's reasoning
 77. Weeding out irrelevant sources
 78. Wondering if I'm done
 79. Writing down notes
-

Appendix H: Sample of Memos Written During Analysis

12/5/2019 4:21 PM

Developing Themes Around Knowledge Types:

I am becoming more intrigued with the idea of distinguishing between cognitive processes that happen in the arena of research and ones that happen in the arena of solving the legal problem. My gut feeling based on the first three transcripts is that there is a lot more attention being given to and higher level processing happening around solving the substance of the problem, and much less attention and lower level processing happening around the research. It won't always be possible to entirely distinguish between research and problem-solving as they are sometimes completely intertwined. But, perhaps I could set up a separate node entitled "substance of the cognitive processing" to check out my hunch. The new node would include three or four(?) distinct sub-nodes:

- (1) Researching or Searching: where the content of the cognitive processing is primarily the use of the Westlaw database for discovering and locating relevant information
- (2) Legal Problem-solving: where the content of the cognitive processing is primarily the substance of the legal problem
- (3) Both: where the content of the cognitive processing is both the use of the database and the substance of the problem at the same time (e.g., evaluating the relevance of a document)
- (4) Neither (?): containing elements of neither searching nor legal problem-solving

6/15/2020 6:10 PM

Developing Themes for Research Behaviours:

Categories of Online Legal Research Behaviour

Reading	Online Information-seeking	Writing
Reading Documents	Browsing Chaining Navigating Searching Using an Updating Tool Using a Finding Tool	Documenting Editing

Ellis (1989) and Makri, Blandford and Cox (2008) focused only on information-seeking behaviours. Online Information-seeking is only one of my categories. I have at least two others - reading and writing. I think it is important to include reading and writing in an online legal research behaviour model because such reading and writing happen

simultaneously with online information-seeking. Any online legal research databases should account for the reality of these simultaneous actions in the design of the database.

Also, for teaching online legal research to students, it is important to show reading and writing included in the model because you don't want to give students the impression that the research should be happening in a separate time and space from the reading and writing. The choices around information-seeking are informed by the reading that is happening and the writing or processing that is happening. The reading and the writing are where the substantive learning necessary to provide a solution to the legal research problem is happening, and that learning is informing the next steps in online information-seeking.

Appendix I: Sample Entries from Journal of Research Activities

10/11/2019 10:06 AM I am going to start by separating my codes in the Initial line-by-line folder into "cognitive processes" and other codes.

10/11/2019 11:26 AM Separated codes into folders - Cognitive Processes, Research Strategies or Behaviours, and Other. Eliminated folders for first round line-by-line coding and second round coding. I also clarified and merged a few codes together in the selecting cases, choosing cases, and identifying relevant documents realm.

Next, I am going to continue coding X7S1. Will not force line-by-line coding if there is nothing significant to code. Will code larger chunks of text that show cognitive processes where appropriate.

11/2/2019 2:19 PM Working on coding Y5L2 think-aloud protocol. Keep reminding myself to code for cognitive processes, and not actions or research strategy. So, for example, wanted to code a segment as "conducting keyword search" but then remembered that is not a cognitive process, rather it is a label for a type of research strategy/tactic/action within the database. Better to code "formulating a search query" as that describes a particular cognitive process within the "conducting keyword search" action. If later want to see what particular "research strategies" were being used, can go back and code the action protocols (in combination with the verbal).

For 'writing' code, should go back and re-code things like "writing down relevant facts" to "identifying relevant facts" + generic code for "writing". Benefit of this is that the writing codes don't get separated or siloed from the other cognitive process codes like synthesizing, identifying, constructing an argument, and so on....

For 'reading' code, can collapse codes that describe what a person is reading into just "reading", as whether they are reading a case or reading a fact pattern doesn't really matter - it's still the same cognitive process. Now, will probably want to delineate different types of reading by the quality of the reading, such as "skimming", "close reading", and "purposeful reading".

11/2/2019 4:52 PM Have found three styles of reading: scanning, skimming and close reading that I am going to use for the code 'reading'. Am going to stop coding for the content of the reading in the reading code. Am rather going to code for the style of the reading. Will need to go back through the existing reading codes and re-classify them.