Genres of Search: A Concept for Understanding Successive Search Behaviour[1]

Genres de recherche : un concept pour comprendre les comportements de recherches successives

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Résumé : Cet article présente le concept de « genres de recherche », concept qui permet une meilleure compréhension du phénomène de recherches successives. Le concept est expliqué dans le cadre d'une étude de cas utilisant des méthodes naturalistes pour explorer le comportement de recherche d'information de dix participants, âgés de 16 à 18 ans, dans leur démarche de recherche, de sélection et d'utilisation de l'information pour réaliser un projet de recherche scolaire sur un sujet en lien avec l'histoire de la civilisation occidentale. L'étude révèle une gamme de sous-requêtes, ou de genres de recherche, intégrés au processus de résolution de problème d'information, chacun de ces genres représentant un besoin d'information distinct. Le concept de genres de recherche est utile pour conceptualiser les irrégularités de la recherche successive et offre un regard éclairé quant à la nature des tâches nécessaires au processus de recherche.

Abstract: The paper presents Genres of Search, a concept that contributes to our understanding of the successive search phenomenon. The concept is explained in the context of a case study that used naturalistic methods to explore the information-seeking behaviour of 10 participants, aged 16 to 18, as they searched for, selected, and used information for a school-based inquiry project on a topic related to the history of Western civilization. The study found an array of sub-searches, or Genres of Search, embedded within the information problem-solving process, each genre representing a distinct information need. The Genres of Search concept is useful for mapping irregularities in successive searching and provides insight into the nature of the tasks involved in the search process.

Introduction

It has long been recognized that many information problems are not solved in one episode of seeking information (Belkin 1980; Dervin

1999; Dervin and Nilan 1986; Kuhlthau 2004; Lin 2001; Spink 1996). Defined as the act of seeking information in "stages over extended periods" (Spink et al. 1998), successive searching can more broadly be defined as a problem-solving process, a set of developmental stages that culminate in a solution. The manner in which information seekers approach information problems can depend on their varying states of uncertainty and where they are in the information problem-solving process (Kuhlthau, 2003; Spink, Wilson, Ford, and Ellis 2002; Taylor 1968). While the search may be coloured by evolving states of uncertainty, the overall process is often represented as one unit driven by one purpose—almost a one-to-one relationship between information need and search behaviour. Genres of Search, in contrast, explains search behaviour that, while situated within a larger information problem, is driven by a range of information needs. Genres of Search seemingly exist on the periphery of the information problem and yet, paradoxically, they are integral to the completion of it. In the same way that *genre* is used to describe literary or artistic works that have a distinct style, form, or content, this paper uses the term for searches that are related to the root information problem but are distinct in needs and actual search behaviour.

The Genres of Search concept emerged serendipitously from a study that set out to map out the metacognitive knowledge of 10 participants as they searched for, selected, and used information for a school-based inquiry project on a topic related to the history of Western civilization. (For details related to the findings on metacognitive knowledge, see Bowler 2008.) Kuhlthau's six-stage information search model (ISP) (2004) provided a framework for the study, helping to link stages and tasks in the search process to adolescent metacognitive knowledge. Although the study was not purposed to reconceptualize a particular search model, the participants' search behaviour was so incongruent to what was expected that coding the data with the ISP model proved to be problematic. The participants were often diverted by side-searches while searching for information on topics related to the history of Western civilization. These side-searches, while set within the framework of a history project, were each distinct in form and content, providing evidence of a complex web of search needs and information seeking behaviour. A new framework was devised. Labelled *Genres of Search*, the term encapsulates the notion that information problems consist of a set of separate but related successive searches, each one driven by a qualitatively different information need.

This paper presents the concept of Genres of Search, a refinement of models of successive search that links genre theory to information seeking. It offers a modification of existing models of successive search and proposes a new approach to understanding information need. The paper begins with an exploration of the concept of genre and then takes a look at the research in the area of successive search. The concept of Genres of Search is then described. A discussion follows, focusing on the relationship between information and forms of discourse. Using a genre perspective to interpret user needs is highlighted.

Review of the literature

Genre

In this study, *genre* has been used in three ways. First, it is a tool to develop a typology of search. Second, it expresses the notion that the successive search is a set of distinct, albeit related, searches, each with its own attributes, and not simply the same search repeated until it is successful. And finally, in a speculative way, it explores the relationship between a discourse community and information seeking behaviour.

The very fact that the concept of genre has been applied in a variety of ways in this paper suggests its meaning is complex. Indeed, Kwasnik and Crowston, in their introduction to a special issue in *Information Technology and People* focusing on digital genre, point out that there is no consensus on what exactly a genre is, how to identify it, or even what qualifies for genre status (2005, 77). Nevertheless, it is useful to offer a broad outline of what is meant by *genre.*

The word has its origins in French—*genre* referring to "a kind."[2] In the broadest sense, therefore, a genre is simply a category. Most commonly, however, *genre* is used as a tool to classify a document by its form. Information professionals regularly use genre as a way to group and sort documents that reflect certain conventions of literature such as the novel, the poem, and the drama. The novel is typically subdivided further into fantasy, science fiction, and mystery and adventure (to name a few genres of fictional prose expressed in the novel). In other words, each is its own "type" of literature. Beyond literary genres, information professionals work with other forms of textual documents, such as *informational genres* (catalogues, indexes, and classification systems) and *bibliographic genres*

(forms of bibliographic records) (Anderson 2006, 221–3). Genre, however, encompasses more than text types. It is also used to describe types of music (classical versus rap music), film (film noir), styles of art (avant-garde), and more recently, digital genres that incorporate multi-model representations of knowledge (Weblogs, online newspapers, personal home pages, fan fiction, blogs and wikis, to name a few of the ever-expanding range of digital formats).

Genre also represents the function or purpose of a document—the reason *why* a document was created. Documents, as forms of communication, use their rhetorical structure to present an argument—the poem "argues" for one way of looking at life, the newspaper another. Genre is a way to convince: the savvy communicator matches the message to the form of argument while the savvy information seeker understands how different documents achieve their purpose through form, hence the connection between genre and the function of a document. (Unfortunately search engines don't recognize purpose. The same keywords can find many different genres of documents, leading to the problematic situation of having a set of documents on the same topic but in a multitude of genres. This suggests a potential area of confusion for the information seeker unfamiliar with how genre is used to persuade.)

Document type—as defined by either its form or function—is the application of genre most familiar to information professionals. Anderson, in his review of the concept of genre in information studies, asserts that we must "look at more than mere text types" and stretch the notion of genre in library and information studies to include a broad socio-historical approach (2008, 339). Texts, he argues, exist in a social context. They are the artefacts of a community of practice. As a representation of human activity, genre then stands for more than document type: Genre reflects the conventions of discourse within the community and is "a measure of how much we are socialized into a given discourse community" (353). It is a representation of the system of activities that connect people and documents. Genre represents social action, a mechanism for accomplishing something in a social context. The form of a document represents the thinking of not just its creator, but the community of discourse from which the creator emerged (Miller 1984). To successfully navigate activity systems that are mediated by genre implies an understanding of how knowledge is socially organized. Looking at information seeking behaviour through this lens, one wonders if, and how, genre knowledge shapes action. Are decisions taken by information seekers

shaped by their understanding of how document types (or genres) represent a discourse community? Could genre studies really be user studies, as Andersen suggests (2008)?

Successive search

For many young people, information seeking is more like "one-stop shopping"—a quick visit to Google to solve the problem (CIBER 2008). Sadly, this is not the case for many (if not most) types of information problems. More typically, information problems evolve over time, changing shape each time the information seeker interacts with information systems and sources. The successive search is an emerging research paradigm in information science that reflects this situation. A brief review of the research in this area follows.

White and Roth (2009, 3–4), in their discussion about exploratory search, refer to the traditional single-session "lookup-based retrieval model"—a paradigm based on a one-time query that results in a definitive answer. Such searches are best suited for fact-finding or know-item retrieval where, for example, one might know the title of a book but not the library's classification number. But this type of search doesn't fully represent the complexity and ill-structured nature of human interactions with information. Many in the information science community have responded to this gap with models to situate information retrieval within a broader problem context. Kuhlthau's *information search process model* (ISP) is one (1991; 2004). The ISP model is task-oriented—that is, the stages it delineates are shaped by information tasks—but it is given the task to serve only one topic area at a time. The tasks, or stages, in the search process are *task initiation, topic selection, prefocus exploration, focus formulation, information collection,* and *presentation* (1991). An important feature of the ISP is that it is developmental, in that the tasks unfold sequentially. In the ISP model, cognition and affect are intertwined. Kuhlthau found a pattern of feelings that paralleled the specific stages of knowledge integration during the search process. As information seekers move through the process, their feelings reflect their understanding of their research topic. High anxiety is associated with cognitive uncertainty and is related to difficulty integrating information from various sources into a meaningful whole. A turning point comes when information seekers can find a focus for their information-seeking mission. Cognitive certainty is soon thereafter accompanied by feelings of confidence, helping to launch information seekers forward in their search.

The central lesson for both information seekers and information providers is that formulating a focus is a prerequisite for moving forward in the search process. Kuhlthau's ISP model helped to foster a broader perspective on information seeking behaviour and had an important impact on the field of information science. Research in the area of the successive search continues.

Spink (1996) explored multiple search sessions among 47 graduate students using databases and online public access computers, finding that information seekers tended to modify their search terms and strategies each time they returned to search a database. She called for adaptive information retrieval systems that are built upon the assumption that information seekers will attack an information problem more than once. Like Kuhlthau, Spink called for training that would raise in information seekers the awareness that the search process is iterative. (Interestingly, this was before the age of the quick Google search and yet, more than ever, information seekers still need to hear this message.) Spink, Griesdorf, and Bateman (1999) looked at specific characteristics of the one-topic successive search among a random sample of 100 academic end-users. Precision did not appear to increase over the course of the successive search—fewer items were judged to be relevant after the third search. This finding, the authors argue, could reflect a refinement of the user's understanding of the information problem. Quite simply, a tighter focus on the problem means that less is relevant. The authors asked an important question: what is the relationship between successive searching and the successive stages of the information-seeking process?

Vakkari (2001) expanded upon Kuhlthau's ISP model in his study into the mental models of information seekers and the tasks they perform during the search process. Following 11 graduate students as they prepared their research proposals, Vakkari found a "close connection between the students' problem stages (mental model) in the task performance and the information sought, the search tactics used and the assessment of the relevance and utility of the information found" (44). Calling for a broader perspective in information retrieval research, Vakkari suggests that we think of information seeking as a set of problem stages, each one related to a set of tasks.

Lin and Belkin (2000; 2005) continued with the theme of the one-topic successive search in a study that validated a model of multiple information seeking episodes. Their model, called *multiple information seeking*

sessions (MISE), proposes eight reasons that users conduct multiple search sessions on the same information problem, each reason representing a mode of searching. The modes are *transmitting, spawning, transiting, rolling-back, lost-treatment, cultivated,* and *anticipated.* Lin and Belkin do not state exactly when on the search continuum each mode occurs. Rather they set up a selection of scenarios in which search tasks might happen.

It is important to note that while Lin and Belkin offer a rich and interactive model of the successive search, essentially it works within the framework of the one-topic information problem—the one-topic being the original problem driving the process. In contrast to this approach, the *multitasking information behaviour model* proposed by Spink and her colleagues explains how information seekers search successively for information on unrelated topics *concurrently* (2004; Spink et al. 2006; Spink et al. 2007). In an exploratory study, Spink (2004) observed how one information seeker searched in tandem for information on vacations, cooking, and health, over the course of two search sessions. There were no connections among each of the topics, other than that they all served a personal information need. An interesting aspect of multitasking information behaviour is that information seekers could be seeking information on different topics in parallel searches but in vastly different ways. Spink, Cole, and Waller (2008) argue that multitasking is part of the human condition—people juggle multiple tasks all the time (a prime example being driving while talking on a cell phone)—and this aspect of the successive search should be accounted for in information system design and services.

Interactive information retrieval (IIR) is a subset of *interactive information seeking* (IIS). While IIS is the interaction between the information seeker and an information system (a library or search engine), IIR focuses more narrowly on the interaction between humans and an electronic information retrieval system, typically from the one-topic / one problem point of view (Xu 2007, 958). The assumption underlying IIR is that the target—meaning the information object that is being sought—is known (White and Roth 2009, 39). Spink, in her exploration into multitasking, suggests that the study of IIR is embedded within research into multitasking (Spink 2004). Various empirical models and theoretical approaches have emerged from within the field of IIR (Ruthven 2008; Spink and Dee 2007; Xie 2008; Xu 2007; Xu and Liu 2007). Space does not permit a detailed exploration of each approach, except to say that IIR, much like

the larger area of successive search, is an area of research that is rich in opportunities for discovery.

Information foraging offers a fascinating perspective on the successive search (Pirolli and Card 1995). Taking a cue from animal behaviour, the concept of *information foraging* states that information systems are an ecology, and the way humans operate in this ecology is analogous to the way that animals forage for food. Information seekers, like animals, use adaptive, situational-based behaviour to make choices about information. Adaptation is required because the information task is related to an "ill-structured problem for which additional knowledge is needed in order to better define goals, available courses of action, heuristics, and so on" (1995). Consequently, information tasks are dynamic and change over time.

Similar to information foraging, Marchionini's *exploratory search* describes an "information-seeking problem context that is open-ended, persistent, and multi-faceted ... opportunistic, iterative, and multi-tactical" (2008, 433). But unlike in information foraging, the prey is unknown in the exploratory search and the search is of an indeterminate length that can "last for days, weeks, or months" (White and Roth 2009, 21).

Marchionini sets out a three-tiered hierarchy of search to illustrate the difference between the basic one-episode, "lookup" search and exploratory search, with exploratory search positioned at the highest level. Since the exploratory search incorporates "complex cognitive activities associated with knowledge acquisition and the development of intellectual skills" (White and Roth 2009, 9) it is a higher order of search that requires higher-order thinking.

Marchionini divides exploratory search into two spheres—*learn* and *investigate* (2006). Both require successive search behaviour but their goals are different. Exploratory search that sets out to *learn* invokes the cognitive skills of comprehension, comparison, and integration in order to acquire basic knowledge in the topic or conceptual area. The *investigate* mode of exploratory search, on the other hand, has the task to create new knowledge and operates at the highest level of cognitive objectives in Bloom's taxonomy of cognitive learning objectives, such as analysis, synthesis, and evaluation (1956). Information seekers in the *investigate* mode are looking for gaps in knowledge as much as they are looking for

specific targets, in a deliberate attempt to transform their own thinking about the information problem.

Exploratory search is situated alongside IIR but is not the same phenomenon. While both are successive, the exploratory search tends to use browsing rather than search techniques and is motivated by learning and understanding rather than the desire to find an exact information object. Information foraging is closely related to the exploratory search (in fact, White and Roth see the exploratory search as embedded within information foraging, principally because both use adaptive behaviour). *Multitasking information behaviour* is a broad category of search behaviour—it could include all of the above behaviours running simultaneously. With the exception of *multitasking information behaviour*, which posits that information seekers run searches on multiple topics concurrently, models of successive search behaviour typically assume a one topic / one problem structure. A unifying feature of *all* these models of successive search is their focus on the cognitive state of the information seeker. The guiding principle seems to be that if information seeking changes over time, it is due to changes in the information seeker's cognitive state.

Methods

The case study used naturalistic research methods to investigate the metacognitive knowledge of 10 participants, aged 16 to 18. The study was conducted in two phases: a pilot study conducted during spring 2006 and the principal study conducted six months later. Data derived from the pilot study have not been included in this analysis. Methods used in the study are described below. (For a more complete description of the methods, see Bowler 2007.)

The setting

The setting for the principal study was a Montreal-area, English-language, junior college, commonly called a CEGEP. The acronym stands for Collège d'enseignement général et professionnel or College of General and Professional Education. There are two program streams in the CEGEP system—a two-year pre-university program and a three-year professional program. In either case, the first year is roughly equivalent to Grade 12 elsewhere in Canada because high school in Quebec ends at Grade 11.

New CEGEP students are, in a sense, a clean slate and, at least in terms of library experience, they may have little else to guide them but their metacognitive knowledge. CEGEP students negotiate the complex world of information in a new learning environment, many having just graduated from high school the year before. This puts an interesting twist on their search behaviour because the CEGEP library and information systems available through the library are completely new to them. As well, the position of teacher-librarian does not exist in Quebec public high schools and most private high schools, and therefore information skills instruction at the high school level is limited to what students learn from the classroom teacher.

The participants

Purposeful sampling was used to select a specific course that had a full-term research project as its major component. While the specific course—History of Western Civilization—was selected purposefully, few constraints were set on the individual characteristics of participants drawn from these classes. In other words, the study was open to any student in the class wishing to participate. All volunteers were accepted, irrespective of gender, language, or ethnicity, or of the number of volunteers. Ultimately, 10 participants, aged 16 to 18, participated in the study. They were all in their first term at CEGEP, having graduated from high school the previous year, and all were therefore new to the school. All participants were academic achievers, having been accepted to a specialized Arts and Sciences program at the CEGEP.

The information-seeking task

The information-seeking task was created and assigned by the teacher. The 10 participants were asked to write a seven- to eight-page argumentative essay exploring continuity and change in Western civilization, on a topic of their choice. To do so, they searched for, selected, evaluated, and used information from a variety of sources over the course of the fall 2006 term. The search process was a critical element to the success of the assignment because the students were to use information sources to defend their position. The class had an assigned textbook but it was not to be included in the list of sources for the research paper. The students were first asked to identify a topic and to locate it within a specific geographic location and time frame. No specific guidelines or boundaries for the topic were provided, as long as it was related to the history of

Table 1: Research topics for school assignment

Baroque and classical music
Greek architecture: Doric and Corinthian
Greek philosophy: Hellenic and classical Greek views of nature, as embodied in the visual arts
The influence of the scientific discoveries of ancient India on Western civilization
The study of stars in medieval Islam and Renaissance Europe
Greek philosophy and early Christianity: The infinite God, human love, and sexual understanding
Women with influence during the Egyptian New Kingdom
The French Revolution
What happened to Christians during the transition to the Ottoman Empire
Clay tablets versus papyrus: The evolution of Egyptian libraries

Western civilization. As a result, the 10 participants investigated a wide array of topics—from Greek architecture to classical music (see table 1).

The students were told about the assignment during the first class (last week of August) and the assignment then unfolded in four stages over the course of four months. By the second week of school they were to identify the topic. Two weeks later they were to present a short annotated bibliography of five sources. They were then asked to critically evaluate one website that would be helpful in their research. And finally, they were asked to write a seven- to eight-page research paper, due just before the end of the term. The bibliography for the final paper had to have at least eight information sources, only three of which could be websites.

Data collection protocols

The study used a combination of *think aloud* and *think after* verbal protocols in order to provide as many venues as possible for the expression of thoughts, feelings, and actions experienced by the participants during the search process. In this way, the data could be triangulated. Five types of data collection protocols were used in this study: (1) a series of three telephone interviews, (2) written and/or audio journals kept by the participants over the course of the semester, (3) an in-person interview immediately following the final submission of the essay, (4) a visualizing exercise (a timeline), and (5) a follow-up interview conducted several months later (see table 2). Metacognitive knowledge was specifically

Table 2: Verbal protocols: Think aloud or Think after

Protocol	Think aloud or Think after	Application
Three telephone interviews	Think aloud	One interview in the beginning of the semester and two interviews in the middle (before the research paper was submitted)
One in-person interview	Think after	At the end of the semester (after the research paper was submitted)
Visualizing exercise (timeline)	Think after	At the end of the semester (at the same time as the in-person interview, after the research paper was submitted)
Written and/or audio journals	Think aloud and/or Think after, depending on when the participant completed it	Throughout the study, as the participant saw fit
Follow-up interview with students	Think after	10 months after the completion of data collection, midway through data analysis

targeted by questions related to *why* and probes designed to reveal the *self-prompting questions* the participants may have asked themselves. Questions related to actions helped to situate the participants' progress throughout the search process and were the critical factor in uncovering the different genres of search.

Data analysis

Analysis was inductive and grounded in the data, using the words and actions of the 10 participants to tell the story of their journey through the information search process. The data were transcribed and imported to a qualitative data analysis software application (Atlas.ti 5.2) and one Hermeneutic Unit was created (the "container" for all the data and coding). During coding, the data were segmented, or chunked, into meaning units that lay at the sentence and paragraph level. Using a grounded theory approach, three levels of codes were developed—*descriptive, interpretive,* and *pattern* (Miles and Huberman 1994, 57)—each representing a progressive drilling down through the data toward its essential themes.

Limitations

The sample was small, so generalizations beyond the context of the study will be difficult to infer. The 10 participants in this study were high

academic achievers in a Montreal-area private school, and their behaviour may not reflect that of the general population. As well, some of their behaviour may have been shaped by the type of information task assigned to them by the teacher. The results of this study relate to a specific content area—the history of Western civilization—and are not generalizable to other content areas or information seeking tasks. In addition, the extent of the students' prior domain, information system and metacognitive knowledge, in relation to other students of their age, were not known, as the qualitative methods to be used in this study precluded the use of a control group or wide sampling procedures. Only 2 of the 10 participants in this study were male and therefore the study presents no findings on gender-based behaviour.

Research findings

Genres of Search

Genres of Search arose serendipitously out of the need to re-conceptualize the framework that underlined this study—Kuhlthau's ISP model—in order to accommodate unexpected, non-linear search. Although this study did not set out to test or redesign the ISP model, the experience of using it to code the data provided the researcher with some insight into its nature and raised questions about its linear design. Framing the study around the six consecutive tasks in the ISP model—*initiation, selection, exploration, focus formulation, collection,* and *presentation*—actually proved quite difficult at times, and it is worthwhile commenting on the reasons for this in order to provide a context for the development of Genres of Search.

The study found that the six tasks of the ISP model held true—the tasks of initiation, selection, exploration, focus formulation, collection, and preparation did occur. However, in the course of their research on a topic in the history of Western civilization, the participants moved back and forth between *prefocus exploration* and *information collection* in a highly iterative, non-linear manner. This was an unexpected finding. The non-linear nature of the search process has been confirmed in other studies. Kracker and Wang, for example, suggested that an "iterative" variable be added to the model in order to address its spiral nature (Kracker 2002; Kracker and Wang 2002). Chung and Neuman (2007), in their study of high school students' information seeking, also found that the tasks of gathering and selecting (related terms for *exploration* and *collection* in the ISP) repeated themselves in a dynamic, non-linear

way. What *was* unexpected was that the ISP's six tasks were sometimes employed concurrently, in a set of side searches, on separate but related topics, each one distinct but critical to the successful completion of the information problem.

The ISP model, as a model of the successive search, presents a one-to-one relationship between the information need and the search process. In other words, the beginning, middle, and end of the process represent one unit driven by one purpose and one topic. In contrast, this study found that the search process actually consisted of a many-to-many relationship, with several types or *genres* of search embedded within the process, each search representing a different information need. Although the searches were related to the root information problem—in this case, to find information on a topic for a research assignment for school—each search was distinct in information need, and the form of search behaviour, hence the confusion when coding the data for tasks in the ISP. These side-searches have been labelled *Genres of Search.* What do Genres of Search look like in the context of a school-based inquiry assignment? Some examples follow:

Structural search: Participants searched for and explored within meta-tools, such as encyclopedias, Wikipedia, and the table of contents in books. This type of search was used to build a conceptual understanding of the topic.

Details search: Participants searched for factual information in chapters and articles. The results of this type of search were used as content for the research paper.

Author-biography search: At the request of the teacher, participants had to determine the credibility of authors in order be able to reference an information source in their research paper. To do so they ran separate searches just to find biographical information on the authors.

Re-finding search: When gathering information, some students forgot to note where they had found quotes or important ideas. They had to re-run their searches, but this time to find specific text that they knew existed.

"How to cite" search: This type of search was used to find instructions on how to cite sources. Many participants had trouble understanding the technique for using quotes and citing sources. They asked, "How much should I cite? What do I do if the book was written in a language other

than English? Do I use the original text or do I translate it?" To answer these questions required yet another search to determine the rules for referencing sources.

"Padding the bibliography" search: Wrapping up, some of the students realized they were missing one or two sources. Even though the essay was written, the teacher had said they needed eight sources (they obviously used fewer to write the essay) so they launched a new search, essentially to find material to pad the bibliography. The form and content of the information objects retrieved mattered less than its ability to fulfil the requirements of the assignment.

Image search: Participants searched in image databases for visual clues that might provide clues for further text searches (such as the date or the name of a queen either found within an image of the queen or used to label the image).

Relationship to models of the successive search

The Genres of Search concept is useful for mapping irregularities in successive searching and provides insight into the nature of the tasks involved in the search process. Genres of Search, as a model of successive search, lies somewhere between the single-topic, successive search (Kuhlthau 1991; 2004; Lin and Belkin 2005; Spink 1996; Spink, Griesdorf, and Bateman 1999; Vakkari 2001) and the multitasking information behaviour model, in which information seekers look for multiple topics concurrently (Spink 2004; Spink, Cole, and Waller 2008). How so? While the information seekers in this study looked for information on multiple topics concurrently (for example, looking for information on Greek architecture, then searching for information on how to cite it), the searches did seem to circle around a larger information problem. Unlike the searcher in Spink's 2004 study, who looked for several unrelated topics simultaneously and in no apparent order of priority, the subjects in this study ran a set of searches on a variety of topics that all served a grander purpose—the school assignment. Lin and Belkin (2005) seemed to have captured this type of behaviour in their MISE model of the successive search, specifically in the "spawning" mode of successive information seeking episodes (395). In spawning, subproblems emerge from the central information problem, which extends "over the surface of the original problem" and has a "higher priority than the original problem" (Lin 2001, 532). One difference between spawning and the concept of Genres of Search is the nature of the sub-

problem. In spawning, the problem changes because the understanding of a topic area has evolved and new, related concepts have been discovered. In contrast, in the Genres of Search model, new searches do not necessarily lead from adaptations to the information seeker's conceptual model of a topic area. For example, a biography search on an author who has written about Egyptian queens is related to the topic area, but the search does not necessarily represent a refinement of the information seeker's understanding of the topic—it is merely a separate search task that is perhaps related to the type of document being sought.

Genre theory and information seeking

Initially, the concept of Genres of Search was used as an umbrella term to help gather a set of descriptors to qualify the search observed in this study. The concept made concrete the notion that the path toward the solution of an information problem is not a single, straight line, but rather, a collection of different *types* of searches that are separate but related to the larger information problem. This conception of Genres of Search, however, is rather limited, as it does not answer the question of *why* these successive searches occurred. What made the participants follow through on a series of successive searches on different but related topics?

Perhaps the application of a broader definition of genre will guide us toward an explanatory framework. Genre, it will be recalled, is more than mere "type." It can represent a system of communication and a means to achieve a purpose within a given discourse community. Anderson, in his survey on the uses of genre in information studies, states that LIS has ignored the purpose of a document and argues for a genre approach to understanding human information behaviour (2008). This means starting with the genre and working back, asking questions such as, "How did this particular text come to look and be used as it was? What actions, or goals, is the text intended to support? Who is involved in producing and using this text?" (355). Using genre theory to conceptualize search means thinking about the relationship between the way that users interact with information systems and the forms of discourse that they seek. Could there be a link between a Genre of Search and the genre of the document that each search was meant to find?

Looking at the successive searches revealed in this study, there is some evidence, albeit preliminary, of a linkage between search and the form

Table 3: Linkages between genre of search and genre of document

Genre of search	Genre of document
Structural search	Reference works: encyclopedias, textbooks
Details search	Scholarly texts: chapters, articles
Biography search	Biography
"How to cite" search	Instruction manual
Image search	Art, photography (non-textual)

of document sought. As a result of the contextual nature of this study, it is difficult to know exactly what documents were retrieved, but from the students' own words it seems that their search behaviour was determined in part by the type of document they were looking for. Five of the seven Genres of Search were potentially aligned with a particular type of document. (Table 3 outlines the potential relationship between Genre of Search and the genre of document.)

When looking for documentation that would lend support to building a conceptual structure of the topic, participants ran a *structural search*, saying they were looking for metatools that would provide the "big picture." These tools are often considered to be reference works, such as encyclopedias, handbooks on specific topics, and introductory textbooks. It seemed the participants knew that such texts were qualitatively different from texts that would give more detailed information. When they did need more finely grained information, participants ran a *details search*, looking for scholarly texts in journal articles and chapters in books, using either journal databases or the index in the book to find them. Looking for biographical information on the author—a requirement imposed by the teacher as a way to assure the credibility of information—necessitated a separate *biography search*, independent of the search to find information on the research topic. (It is interesting to note that the organization of many public libraries gives concrete evidence that the biography is a distinct genre, or type, of literature. Often biographies are classified and shelved separately from the rest of the non-fiction collection.) Finding information about how to cite sources properly was like looking for an instruction manual—another distinct form of non-fiction—while looking for images required an understanding that visual information would be found in art sources such as image databases. (The separation of art books from the regular non-fiction collection in a public library is an

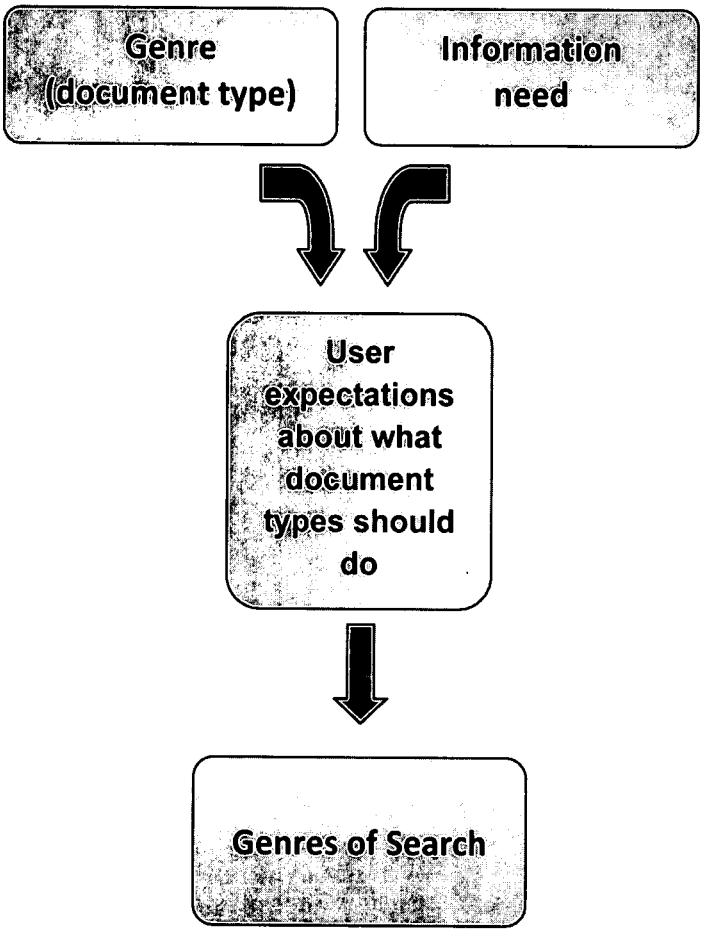

Figure 1: Interactions among genre of document, information need, and user expectations

analogous example of how genre affects the treatment of documents and ultimately the way we retrieve them.) The results of this study point to a potential relationship between search and genre of document. It seems that information needs are transformed as information seekers adapt them to their expectations of what document types should do, leading to searches that are tailored to match the genre of document. (Figure 1 models the interactions among information needs, document types, and information seekers' expectations.)

Another interesting aspect of the relationship between search and genre of document relates to the social aspect of search. Models of the succes-

sive search emphasize changes in the cognitive state of the information seeker. But if it is true that genre is representative of social discourse, then the successive search is much more than a change in cognitive state—it has a social element to it as well. It is, in short, a way to adapt to social contexts. Does search change to reflect expectations of how a discourse community carries on its business? Information need may be more complex when notions of genre as a representation of the communication patterns of a discourse community are added to the mix.

If there are links between Genres of Search and the genre of the document that the search was meant to find, then we also need to ask whether genre is a criterion for relevance. This does not appear to be the case, at least insofar as users are concerned. Xu and Chen (2006) looked at 242 user studies to determine the core elements of relevance judgement and found that relevance could be distilled into five core elements: topicality, novelty, reliability, understandability, and scope. Genre, interestingly, does not appear to be a factor. Whether this represents the irrelevant nature of genre or a gap in the information seeker's understanding of genre is unclear.

Conclusion

Genres of Search was a serendipitous finding—the larger study into the metacognitive knowledge of adolescents did not set out to investigate the phenomenon of the successive search. Nevertheless, the findings provide concrete evidence of the successive, multi-topic search and what it looks like. Furthermore, the findings present a preliminary typology of Genres of Search, in this case, related to the school research assignment. Investigation into other types of information problems—for example, in the area of health information—may yield yet more genres.

The suggestion of a linkage between the genre of search and the genre of document is intriguing. If genre knowledge is part of the equation then one wonders how well information seekers actually understand genre and its potential effect on their search outcomes. Is there a link between Genres of Search and information competencies? Could information literacy be equivalent to genre knowledge? The notion allows us to reflect on the nature of information and its relationship to information behaviour.

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Notes

1. The author presented an earlier version of this article at the 37th Annual Conference of the Canadian Association for Information Science, Carleton University, Ottawa, May 29, 2009.
2. *Concise Oxford English Dictionary*, 11th ed., rev. Oxford University Press, 2008.

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