An Exploratory Study into the Information-Seeking Behaviour of Grade-Three Students

Abstract
As the Internet and new pedagogical methods are introduced into the classroom, young children in the lower grades of elementary school are engaging in multi-source research to support class projects. The proposed phenomenological study is advocated to study the techniques employed by young students when looking for information, the kinds of sources they prefer, how these sources are used, what barriers are confronted, the students’ feelings about the process, and how they can be helped to exploit better the information resources available to them.

1. Introduction
Students require information to support class projects. This is true whether the student is at a post-secondary, high-school, or elementary-school educational level. Although research examining information-seeking behaviour has been conducted with students in the upper grades of elementary school and higher, very little research has been done with younger students in the lower grades of elementary school. This is despite the changing nature of the elementary-school classroom which, even at the lowest grades, employs such pedagogical methods as Inquiry Learning and Project-Based Learning. These changes to the classroom environment mean that students in the lower grades of elementary school are required to seek information for school projects. Another change to the classroom is the strong push to make information technologies such as the Internet available and accessible to students in every school, and indeed, in every classroom across Canada, an initiative that places new and more complex demands upon students’ information seeking.

Very little is known about the techniques employed by young students when looking for information, what kinds of source formats they prefer to use and how these sources are used, what barriers they confront, how they feel about the process, and how they can be helped to exploit better the information resources available to them. Although during the past 25 years many different models of information-seeking behaviour have been proposed to help define and explain the process, none have been based solely upon empirical data generated by younger elementary-school children. Furthermore, none are
specific to any particular age group even though research into children’s intellectual development has revealed many important intellectual changes throughout childhood, that these changes occur much more rapidly in younger children than in older children and adults (Piaget & Inhelder, 1969; Siegler, 1998), and thus even small age differences become significant. Because of these rapid changes in intellectual development, it follows that using data collection methods designed for research with older children and/or adults may not be appropriate for research with younger students. This paper presents a proposed methodology that adapts several traditional data collection methods so that they are suitable for research with young children.

2. Intellectual Development and Children
The past 50 years have witnessed considerable research concerning the intellectual development of children. Childhood is a time when a gap of only a few years can make an enormous difference in intellectual capability. For example, there is a huge difference in intellectual development between a five-year-old kindergarten student and a two-year-old toddler despite the fact that the age differential is only three years. Similarly, a large difference is recognized between a grade-three student and a grade-six student. Since an overwhelming majority of research into information-seeking behaviour has been with children in grade-six or higher, with several grades together (e.g. Solomon, 1993) or with several ages together (e.g. Shenton & Dixon, 2003a, 2003b, 2003c) the findings cannot be automatically applied to any specific grade or age level. As children mature and gain experience, their knowledge about the world around them increases. They are able to plan ahead and strategize more effectively and with less cognitive effort.

Piaget’s Theory of Intellectual Development
Piaget believed that children create theories about how the world works and that these theories, though often incomplete, help children to more easily predict and understand phenomena. To accomplish this, children use schemes, which are “mental categories of related events, objects and knowledge” (Kail, 2004, 174). In infancy the schemes are based mostly on actions, but as the child ages and matures, these schemes give way to those based primarily on functional or conceptual relationships. As development continues, older children and adolescents retain the latter schemes but also add schemes based on increasingly abstract properties. Piaget’s theory identifies four major stages of development: the Sensorimotor stage (0 to 2 years), the Preoperational stage (2 to 6 years), the Concrete Operational stage (7 to 11 years) and the Formal Operational stage (11 years and older) (Piaget & Inhelder, 1969). Thus, according to Piaget’s theory, children in Grade-three (8 to 9 years) fall into the middle of the concrete operational stage.

The concrete operational stage is characterized by the first use of mental operations (strategies and rules) to solve problems and to reason. These mental operations “make thinking more systematic and more powerful…[and] give concrete operational thinking a rule-oriented, logical flavor…[yielding] consistent results” (Kail, 2004, 185). Concrete, when defined in the Piagetian context, means that the child can think logically about real objects and actions and can manipulate them in his/her mind without the need to
physically manipulate the visual data that is available (Ginsburg & Opper, 1988). Two very important developmental concepts characteristic of the concrete operational stage are reversal and reciprocity. Not only can concrete operational children reverse their thinking, they can also grasp the idea of reciprocity (an example of reciprocity is the realization that two glasses which appear different—one is tall and thin, the other short and wide—can still hold an identical amount of water even though one appears to hold more than the other). According to Piaget these two concepts cannot be mastered in the earlier two stages (Piaget & Inhelder, 1969). One of the reasons for this is the fact that the limitations caused by the egocentricity characteristic of the preoperational stage are no longer present in this stage. The egocentric child believes that everyone sees the world as s/he does, is centered in his/her thinking and confuses appearance with reality. This freedom from the limitations of egocentricity enables the child to realize that there are many different facets to many problems and that appearances can be deceiving (Kail, 2004).

Despite its many advances from the preoperational stage, the concrete operational stage also has its limitations. Probably the biggest limitation is the fact that although the child can mentally manipulate objects, appreciate the many potential facets of a problem, and realize that appearances can be deceiving, nonetheless, the child’s thinking is rooted in the present, the tangible and real. Abstract and hypothetical thought is often beyond the concrete operational child’s ability and so s/he often resists reaching conclusions that may contradict known facts, instead reaching conclusions that are based on her/his existing (limited) knowledge of the world (Kail, 2004).

Although it is still highly regarded as a useful means of understanding children’s intellectual development, some researchers have criticized Piaget’s theory for its rather rigid demarcation of the different stages. Piaget asserts that children master different concepts as they move from one stage to another, meaning that children should not be able to learn concepts characteristic of a later stage (Piaget & Inhelder, 1969). For example, a child in the preoperational stage should not be able to master conservation, a concept characteristic of the concrete operational stage. However, recent research has discovered that with appropriate instruction, children can indeed be taught these concepts ahead of when Piaget believed they could be learned (Kail, 2004). Conversely, some children do not quickly master the concepts characteristic of their stage of development. These findings are important in that they indicate that children are not locked into the confines of the stages of development as defined by Piaget. It would seem that movement between stages is more fluid and less defined than the Piagetian theory presents.

**Information Processing Theory**

Recognizing the limitations of Piaget’s theory, Information-Processing Theory suggests other reasons to explain why children develop as they do. Although there are many variations of the theory, the most fundamental assumption shared by all is that the act of thinking is, in fact, information processing. As Siegler (1998) explains, rather than focusing on stages of development, information-processing theories “focus on the information that children represent, the processes that they apply to the information, and
the memory limits that constrain the amount of information they can represent and process” (64). Because information-processing theories analyze cognitive growth based on age-related changes in the capabilities of children to process information, they tend to be more precise than theories such as Piaget’s that employ a stage approach. Sensory memory, working memory and long-term memory provide the framework for information-processing theory. Sensory memory is a brief information storehouse (no longer than a few seconds) of raw, unanalyzed information. Working memory is the place where active thinking (construction of new strategies, problem-solving, reading comprehension, etc.) occurs. This is accomplished by combining information arriving in sensory memory with information that is stored in long-term memory and transforming it into new forms. Working memory is limited by factors such as its capacity (the number of symbols it can operate on at one time) and the rate at which information is lost. Unlike sensory and working memory long-term memory does not have limits on how much information can be maintained or how long the information can stay. However, although information is rarely forgotten from long-term memory, it is not always easy to access (Kail, 2004).

Whereas Piaget’s theory emphasized equilibration (the vast reorganization of mental structures in order to more readily assimilate schemes) as the mechanism through which cognitive development occurs, information-processing theorists posit that developmental change comes about in several forms. The information-processing theorist attempts not only to identify the mechanisms of change that contribute most to development but also to explain how they work together to produce cognitive growth. Conversely, the cognitive restrictions that inhibit development from occurring more rapidly than it does are also identified and examined (Siegler, 1998). Some cognitive inhibiting processes are actually beneficial to the operation of working memory because they prevent task-irrelevant information from entering. These processes improve and become more effective as the child grows and matures. The combination of inhibitory processes, planning, and cognitive flexibility produce what is termed “executive functioning” (Kail, 2004). All of these elements are known to develop through childhood and as a result, as the child ages s/he is more able to prevent irrelevant responses, formulate more effective plans, and to modify those plans as required. During the learning of a skill or task, the information is stored in the working memory. Because younger children have limited experience compared to adolescents and adults, their information processing requires a great deal of working memory capacity. As they gain experience, however, some processes that have been mastered can be transferred to long-term memory, freeing up space in the working memory. This allows for the learning of new tasks. Thus, older children are more likely to succeed at performing complex tasks involving many processes because they can perform some of the processes automatically resulting in an increased processing speed (processing speed refers to the ability to perform simple cognitive tasks automatically) (Hale & Fiorello, 2004), whereas younger children must think about most or all of the processes, putting a huge load on the capacity of their working memory (Kail, 2004). This is not to say that younger children are incapable of performing the processes, but that it might take a much longer period of time than for an older child to perform the same process. Kuhlthau (1988) also has voiced reservations about the abilities of children in the concrete operational stage of development because of
their lack of, or difficulty with the abstract thought process that she considers to be essential for multi-source research. This skill is not attained until the age of 11 years when (according to Piaget) children have progressed to the final stage of intellectual development, the formal operational stage. As Kuhlthau (1987) affirms, “Before the stage of formal operations is reached, sometime between the ages of eleven and sixteen, most children may have difficulty with library-related tasks requiring abstraction. Most extensive research assignments require considerable abstraction to collect, analyze, synthesize, and present information from a number of sources” (25). Therefore, traditionally it has been at the formal operational stage (grade six) that the testing of information-seeking models has begun.

3. Educational Practices and Information Technology in the Classroom

As research into the relationship between education practice and learning continues to advance, several new educational initiatives have been introduced into the school curriculum starting in the early grades of elementary school. The most prevalent of these are Inquiry Learning and Resource-Based Learning (often termed Project-Based Learning). Both of these initiatives are based on constructivist theory, in which the individual seeks meaning from the information s/he encounters. Constructivism (or simply put, learning how to learn) asserts that people use information from their own experience to create constructs in order to problem solve, anticipate future events and to make sense of the world (Dervin, 1999; Kuhlthau, 1993b, 2004; Pitts, McGregor & Stripling, 1995). Thus the information obtained must have meaning so that it can be used in a “dynamic process of being informed” (Kuhlthau, 2004, 3). As Dervin and Dewdney (1986) assert, “information does not have an independent existence but is rather a construct of the user” (507). Therefore, constructs, as guidelines or frames of reference created by the individual to determine the choices s/he makes, have a direct effect on the individual’s behaviour.

In Inquiry Learning students develop a question (often using hypothetical-deductive reasoning), attempt to answer the question by conducting research, and finally make conclusions based on the research (Windschitl & Buttemer, 2000). Kuhlthau (2003) underlines the importance of Inquiry learning in the modern classroom when she states, “The process of learning from a variety of sources in an essential ability in the information age. Students need to learn to construct meaning from vast, disparate sources of information through an inquiry process approach to learning...An Inquiry approach calls for guiding students in thinking and reflecting in the process of information seeking and use that leads to understanding, learning and to transferable information literacy” (3, 4).

In Project-Based Learning the students conduct in-depth investigations into real-world topics. It is a form of hands-on learning that “engages all students—from special education to gifted—in a way that the traditional lecture/worksheet/textbook/written test cannot” (Curtis, 2002, 51). According to the San Mateo County Office of Education website: ““Project-based learning (PBL) is a model for classroom activity that shifts away from the classroom practices of short, isolated, teacher-centered lessons and instead emphasizes learning activities that are long-term, interdisciplinary, student-centered, and
integrated with real world issues and practices” (http://pblmm.k12.ca.us/PBLGuide/WhyPBL.html).

Another educational initiative that probably has had the greatest impact in the shortest amount of time is the introduction of information technology (IT) and especially the Internet into the classroom. The Internet, with its myriad resources available literally at the click of a mouse has had a profound impact on student research. With the resources available on the Web, children, even in the lower grades of elementary school, are often asked to perform research in order to complete class projects. A quick glance into websites devoted to initiatives such as Inquiry and Project-Based Learning provides evidence that young students are often expected to perform multi-source research whether or not they are intellectually prepared to do it. In fact, despite the challenges, both physical and mental, faced by younger students in searching for information, the ability to conduct multi-source research even in the early grades of elementary school is considered essential in the information age. Ongoing research into children’s intellectual development is continuing to discover more about the capabilities and limitations of children’s thinking processes, and in turn, the effects of different educational and learning strategies. Thus, it would appear that now more than ever research into the information-seeking behaviour of younger children is necessary in order to identify and address the challenges that modern children face in the information age.

Over the past 25 years many models of information-seeking behaviour have been constructed to identify and address the challenges faced by individuals as they search for information in different environments (e.g. university, the workplace, secondary school). However, these existing models are based on findings from research conducted with older children and/or adults who are more intellectually and emotionally mature, have much more worldly experience, and face different challenges than their young counterparts. This makes the models potentially inappropriate for application to the information-seeking behaviour of young students. Some of the studies informing these models, however, do provide valuable insight into different methods that can be used to collect meaningful data and the models themselves each contain aspects that may be useful in developing a specific model for grade-three students.

Why study grade-three students?
Grade-three students fall into the middle of the concrete operational stage. They are also at a crossroads in their elementary-school education—neither in the beginning stages (Kindergarten to grade two) or the latter stages (grades four to six). As they become capable of more complex thought, their reading and writing skills develop and improve, and they are often familiar with computer technologies. Inquiry learning and Project-Based Learning are integrated into their curriculum and they are beginning to work on larger class projects that require them not only to search for and locate information but also to seek meaning from it in a constructive process of learning. Thus, a methodological approach that investigates how these young students search for information, what barriers they confront, what sources they prefer and why, how they use the information they retrieve, and how they think and feel about the process will do much to provide insight into how to best address their unique information needs.
4. Proposed Methodology: Phenomenological Study

I will use a qualitative methodology for the research in the form of a phenomenological study. This type of research methodology is appropriate for this research because not only do I want to describe the children’s experience of information seeking but I also want to explore how they experience it; in other words, I want to study how the children “…construct and give meaning to their actions” (Denzin, 1998, xvii). Furthermore, phenomenology is exploratory (Maykut & Morehouse, 1994) and concerned with the “…nature of the essence of the experience…Phenomenological research is the study of essences” (Patton, 2002, 106). I plan to conduct the research with a small group of grade-three students in a school operating as part of an English school board in a middle-class suburb of Montreal.

A phenomenological methodology comprises various data collection techniques of which I will be using five: participant observation, questionnaires, interviews, journals/search logs (the students will record their search experiences in their journals) and the participating students’ final projects. These techniques will need to be modified so that they are suitable for data collection at the grade-three level. Cooper (2002) used qualitative methods to collect data for her exploratory research on the information-seeking behaviour of seven-year old children and Kuhlthau (2004, 31) successfully employed the same five techniques when investigating the information-seeking behaviour of high school students. Since the nature of my research is exploratory and descriptive, the data collection methods must be flexible enough to support unexpected and surprising results. Furthermore, the participants are young and their writing capabilities are still at a rudimentary level, making high-level collection methods infeasible.

4.1 Research Set-up

The data collection will take place in the school library via timetabled sessions. The computers available for searching of the Internet will be equipped with screen capturing software or some other means to record the children’s search activities but not the children themselves. To provide further data, the children’s conversations at the computer will be audio-taped. A video recorder will be set up to videotape the library area containing the bookshelves holding the books relevant to the project in order to capture the children’s activities.

Although the literature alludes to problems related to videotaping sessions (for example, privacy and security issues and the children’s tendency to perform in front of a camera, no matter how unobtrusively placed) for this research the positive aspects of videotaping the sessions far outweigh the negative. For example, to use audiotapes as the principal data collection method in the often lively, active and animated environment of a group situation would be very problematic. Not only would it be very difficult to transcribe so many voices but also to identify each child would be virtually impossible. Field notes, although helpful, are often sketchy. Cooper (2002) in her case study of the information-seeking behaviour of young children videotaped their sessions in the school library with positive results. She reports that instead of acting up in front of the camera for the most part the children ignored it and acted as if it were not present.
Since education is not confined to the school building, even young children are often asked to work on assignments outside of class time. To accurately reflect this reality, the students will be encouraged to work on the project at home as well as at school. It is for this reason that I intend to interview the parents/guardians of the study participants after the project has been completed. This is to provide insight into what work the children did after hours and how the parents were involved.

4.2 Data Collection Instruments
Since the study is investigating grade-three students who are at a rudimentary reading level, and whose domain knowledge and information-literacy skills are minimal, it is necessary to adapt some of the existing data collection methods so that they reflect this. This is especially true for the questionnaire and the journals.

Questionnaire
The purpose of the questionnaire is to obtain general data about the grade-three classes from which the children for the study will be solicited. This questionnaire, quantitative in nature, will provide necessary background information on the children’s basic knowledge and experience in searching for information and will provide added context in which to situate the data. The questionnaire will be brief and written in simple language so as to elicit responses from children who do not have well-developed reading skills. To minimize the cognitive load and thus encourage completion, the questionnaire will offer several choices for each question and will not require much writing on the part of the students (only if they wish to elaborate on a question will they be asked to write more than a few words). The questions are structured in such a way that the student checks the box that best completes the sentence (e.g. For me, the easiest way to find information for school is by…☐ looking at books, ☐ looking at the Internet, etc.) or the student checks as many boxes as s/he wishes (e.g. When I use the Internet I use the following search engines…☐ Google, ☐ Ask Jeeves, etc.).

Participant Observation
Participant observation differs from observation in that I do not try to remain unobtrusive but instead interact with the children in their natural environment; in this case the place within the school where they will be searching for and using information. As a data collection technique, participant observation, by allowing me to participate in the children’s experience by asking questions and interacting with them as they go about their tasks provides a more in-depth look at how children search for and use information than would observation on its own. Furthermore, as Ball (1990) states, "The researcher never can be the invisible fly on the wall...but is always and inevitably a part of the scene" (159). Previous LIS research with children has indicated that in order to place the children at ease, it is undesirable to replicate the classroom experience where there is a teacher—student relationship. The literature also advocates a relaxed group setting of no more than six to eight children at a time with the researcher dressed in casual apparel (Druin et al, 1999; Graue, Walsh, et al., 1998; Large, Beheshiti, Nessel & Bowler, 2003). The context of this study does differ from some of these studies which were held outside of the classroom since the assignment for which the students will be seeking information
forms part of the school curriculum and the observation of the children’s activities will be taking place in the school library. Nevertheless, I will not be taking on the role of a teacher and intend to observe and interact with the group by asking the children questions about their activities without directing or helping them with their searching.

The library sessions will be timetabled so that the children know exactly when and how often they will be using the facilities in the library to look for information. Since the assigned project must be of some depth in order to merit multi-source research, the length of time to complete it will likely be in the range of at least three to five weeks. During those weeks, the children should be scheduled to use the school library at least twice per week. No more than a group of six to eight children (depending on the number of children in each group) will be in the library at one time. In this way I can arrange to observe the participants in my study without the distractions of other students.

The sessions in the library will be unstructured. The children will be free to browse the bookshelves, card catalogue or OPAC, or use the computer for electronic searching of the Internet or CD-ROMs (if available) as well as work on their projects. Although the children are free to search as they please without direction from me, I will be asking them questions as they work. I will try not to interrupt their activities too often but, instead, I wish to encourage the children to talk aloud as to what they are thinking and feeling as they search for information.

Interviews
One-on-one in-depth interviews, used extensively in previous research (see Kuhlthau, Turock & Belvin, 1990; Shenton & Dixon, 2004) provide another means of collecting data. I intend to interview the teacher, the children who have consented to participate in the research, and their parents. The purpose of using interviews, as explained by Patton (2002), “is to allow us to enter into the other person’s perspective. Qualitative interviewing begins with the assumption that the perspective of others is meaningful, knowable, and able to be made explicit. We interview to find out what is in and on someone else’s mind, to gather their stories” (341). Interviews, then, are a way for the researcher to find out about the interviewee’s thoughts and feelings; and because interviews provide interviewees with a means of expression for these thoughts and feelings (lived experiences), they provide the researcher with rich narratives for further analysis. These interviews would be semi-structured, in that I will develop an interview schedule to ensure that the same questions are asked of all the participants while allowing the flexibility to explore certain areas in more depth if necessary. To make all of the interviewees (teacher, students and parents) feel at ease I will conduct the interviews in the manner of what Patton (2002) terms an “informal conversational interview” (342). I will also use the technique of Active Listening throughout the interview to confirm that I have understood. Active listening happens when the listener reflects back to the speaker her/his understanding of what the person has said. Not only does this confirm to the speaker that her/his message has been understood but it also gives her/him a chance to correct the listener if s/he has misinterpreted something. Perhaps most importantly, however, is the communication of the acceptance of the person’s thoughts and emotions (Gordon, 1970; Gordon Training International, www.gordontraining.com).
The individual interviews with each child will take place after the work sessions in the school library. The interviews will be held on a rotating basis so that every child is interviewed at regular intervals throughout the duration of the project. These interviews will be a useful complement to participant observation since participant observation on its own does not provide much insight into the children’s affective behaviours, thoughts, or feelings about their experiences. The teacher will be interviewed on a continual basis throughout the duration of the assigned project (from project planning to final assessment) to provide insight and context. The parents of the students who are participating in the study will be interviewed at the end of the project to give much-needed information about the children’s experiences while working on the project at home.

Journals/Search Logs
Kuhlthau (1993b, 2004) employed journaling as one of her data collection instruments in her earlier research with high-school students. She explains that the purpose of journals is to provide a place in which the study participants could record their thoughts, reflections, actions and feelings about their information-seeking experiences. The students also documented conversations they had with others about their topics both inside and outside the library. According to Kuhlthau, the journals gave the students the opportunity to include personal content with few restrictions. The journals also documented the progression of the searches and reflected the changes in the students’ understanding of the topic from initiation to completion.

Druin and Fast (2002) as part of their three-year research study on the development of new storytelling technologies for children by means of involving children in technology design, encouraged their young Swedish participants (ages five and seven) to reflect on each of their design activities (after each session was completed) in journals by using text and/or drawings. Through analysis of the journals the researchers were able to identify the changes occurring in the children throughout the three years of the design process project. Harada (2002) used journals as a method in which to deepen upper-level elementary school students’ awareness and understanding of the cognitive and affective aspects of the information search process. Wallace, Kupperman, Krajcik, and Soloway (2000) in their study of sixth-grade students using the Web as a resource for a science assignment also employed journals. Every day during the duration of the project the students were asked to record their information searching activities (e.g. keywords used, web addresses, website content) in their journals.

In my study, the children would be encouraged to document their searching experiences in a journal on a regular basis and especially if they do any searching outside of the school. In this way it will also act as a search log. Since journaling would not be restricted only to the times when I am present with the children, they should provide additional data on information seeking that is rich in meaning and nuance. It must be kept in mind, however, that as reported by Wallace, et al (2000), the students may not consistently record their activities in their journals. Also, because the written language skills of grade-three students are still at a rudimentary level, the journals, although they may contain written descriptions of the students’ experiences, may instead document the
process through the use of drawings. Glynn (1997), in his research with children’s drawings of their mental models of key science concepts states that “[d]rawing is a hands-on and minds-on activity. It is inherently constructive and motivating for students…One advantage of this method is that students’ development of understanding can be traced …” (30). Arizpe and Styles (2003) in their work with children interpreting pictures report that the children with whom they worked were often able to articulate through their drawings things that were omitted in the talk-through protocols.

Final Projects
The final products produced by the children participating in the study in order to satisfy the requirements of the assignment will provide another source of data to analyse. The purpose of using the projects for data analysis is to determine the extent to which they reflect and corroborate earlier data obtained from participant observation, interviews, and journals. For example, if a child is having problems searching for, finding, and using information, will her/his project reflect this difficulty?

The nature of the assignment is a key factor for successful research. Kuhlthau (1993a) identifies poorly designed assignments as a primary inhibitor to successful information seeking. Therefore, for the purposes of my research, the assignment must be broad enough in scope to encourage research in different areas but not so broad as to discourage focus formulation of a narrower topic. It must also be in a subject area that allows for more in-depth investigation using a variety of sources that are not only readily available to the students but also appropriate for their age level. To accomplish this, I will need to work closely with the classroom teacher, drawing upon her/his expertise with the grade-three curriculum requirements.

It should be noted as well that the nature of an assignment means that the user’s information need is imposed (Gross, 1995, 2000). With an imposed query the user in essence becomes an agent for someone else (in this case, the teacher) and as a result is often unfamiliar with the subject matter. Because of this unfamiliarity with the assigned topic it is often difficult for the user to know when his/her information need has been met. Thus, an imposed query is very different and more difficult to satisfy than a self-generated question because for the latter the user has at least some knowledge as to the context from which the information need has arisen. This context is critical in helping the student to know if the retrieved information is relevant and when the search can be closed. It explains why the students in a study conducted by Bilal (2002) were more successful completing self-generated tasks than they were with assigned tasks. For the self-generated task they were better able to find information that satisfied their information need—with the assigned tasks they remained unsure about the relevance and amount of retrieved information.

When analysing the projects the limited subject domain knowledge, information literacy skills, and the information-seeking experience of grade-three students must be taken into consideration, however, it is my expectation that the projects will provide valuable data about the children’s levels of success in the information-seeking experience.
4.3 Data Analysis
The use of five different data collection methods facilitates the identification of emerging themes and patterns (Patton, 2002) and strengthens the validity of the study. As the notion of validity arises from positivist and quantitative research theory and this is a qualitative study, most of the conventional quantitative checks for validity are therefore inappropriate and/or not applicable (Sceurich 1997). That said, the issue of the validity of qualitative research is still of concern to the research community. One of the ways qualitative researchers establish the legitimacy and/or validity of their research is by using a mixed-method approach. This approach, originally used in Grounded Theory (Glaser & Strauss, 1967) where it is called triangulation, involves the use of at least three different methods to collect data from the field. Through the use of systematic comparative analysis (coding procedures) similar themes and patterns are identified from the data. From these patterns and themes emerge theoretical constructs (Patton, 2002, 124-127).

5. Conclusions
New educational initiatives alongside the technological advancements currently taking place in the elementary-school classroom have promoted research interest in the information-seeking behaviour of elementary school students, but this research has largely focused on the upper grades. However, the introduction into the lower grades of elementary school of initiatives such as Inquiry Learning and Project-Based Learning, as well as the availability of electronic sources (especially the Internet) have placed more complex demands on young students and are creating a need for a better understanding of how they search for information. Yet many data collection methods suitable for research with older children and adults are inappropriate for use with younger children; new approaches must be explored.

As the changes in intellectual development are the most rapid during the first 11 to 12 years of childhood, it is important to determine if the information-seeking behaviour of grade-three students differs significantly from that of older students in elementary school and if so, how and to what extent. Depending on the findings of this research, it may be necessary and possible to develop an information-search model specific to grade-three children that can be used to inform pedagogical methods and/or technological systems. This in turn will better assist young students to attain the information skills necessary to search for and use information resources in a constructive process of learning.

6. References


http://www.ala.org/ala/aasl/aaslpubsandjournals/slmrb/slmrcontents/volume52002/slr

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