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Grade-Three Students' Use of Print and Electronic Resources

Abstract: As part of a larger study into the information behaviour of grade-three students the use of books and the Internet as information sources was investigated. During class time books and other printed sources were used more often than the Internet. This paper looks at possible reasons why.

Resumé : Faisant partie d'une vaste étude du comportement informationnel des enfants de troisième année, l'utilisation des livres et d'Internet comme sources d'information a été explorée. Les livres de classe et d'autres sources imprimées sont utilisés plus fréquemment qu'Internet. Cette communication présente les raisons possibles expliquant ce résultat.

1. Introduction

Over the past decade the rapid expansion of communication technologies (and especially the Internet) throughout Canada has meant that the Internet has become widely available in public libraries, homes, and schools. The enormous potential of the Internet as a cost-effective and readily available information resource means that many schools which previously may not have had access to much in the way of printed resources are now able to make use of the Internet's virtually unlimited store of information. Yet, mitigating the impact of this potential access are the challenges faced by student end-users in the retrieval of information. To name but a few: the generation of effective search queries, efficient navigation through and evaluation of the plethora of information resources available, the lack of control over the appropriateness and suitability of retrieved information, and the difficulty in assessing the provenance and authority of many websites (see for example, Bilal, 2000; Bowler, Nesset, Large & Beheshti, 2004; Hirsh, 1999; Large & Beheshti, 2000). Despite these challenges, however, research indicates that the Internet has transformed the information-seeking behaviours of students of all ages, even those in the earliest grades of elementary school. Indeed, large-scale studies of teenagers such as those conducted by the Pew Internet and American Life Project (see Lenhart, Simon, & Graziano, 2001; Levin & Arafeh, 2002) have shown that the Internet has become one of the most important educational resources for middle and high school students. These studies report that for this particular demographic when doing research outside of school hours for class assignments the Internet has become as important an information resource as books and other print resources and very often has become a replacement for them. Responding to this new reality, initiatives to integrate information technologies and especially the Internet into all levels within the educational system have been strongly advocated by educators.

Levin and Arafeh (2002) report that if given the opportunity, teenage students would use the Internet as their primary information resource at school, however, despite the many initiatives undertaken to expand Internet availability within the classroom environment, several barriers prevent them from doing so. A few of the barriers mentioned in the study are: the structure of assignments, the quality of Internet access (including factors such as

the lack of class time provided for Internet research and the physical set-up of computer workstations clustered within computer labs rather than distributed throughout classrooms), and restrictive filtering practices. While this study was conducted with teenagers, it is reasonable to assume that these barriers are also faced by students within the elementary school system. Furthermore, younger students in the lower grades of elementary school face even more challenges to information retrieval; they are emergent readers and writers, their intellectual developmental states are in a rapid state of flux (Kail, 2004; Siegler, 1998), and they lack the prior knowledge and experience of their older counterparts. These factors give rise to questions (especially in regard to the allocation of financial resources) to the use of the Internet as a research tool in the younger grades of elementary school. Perhaps the most important question is whether or not at the lower levels of elementary school education money previously used to purchase printed resources should be reallocated to purchase computers, software, and other information technologies. To address this question, as part of a larger study into the information behaviour of grade-three students, the use of books and the Internet as information sources was investigated. It was found that during class time books and other printed sources were used far more often than the Internet. This paper looks at the reasons that could account for this.

2. The Study: The Information-Seeking Behaviour of Grade-Three Students

The research study, conducted in Winter 2006, was a phenomenological case study in a naturalistic setting—the grade-three classroom. The study explored the information-seeking behaviour of two classes of grade-three students in an English-language (French Immersion) suburban school in Montreal as they looked for and used information for a class project on how Canadian animals survive in winter. There were 26 and 27 youngsters respectively in each of the two classes, thus providing a total of 53 potential participants in total. Of these 53 students, 12 volunteers (six in each class) were studied more in-depth. Since the school operates a full French immersion program, the children spent half of their school day receiving instruction in English and half in French. Consequently, the two classes were able to share the same English-language teacher.

Within the larger study, the author was seeking to answer three main research questions: 1) How do grade-three students seek information in support of a class project? 2) What barriers do they face and how can they be helped to more effectively search for and use information? 3) Are there any features of existing models of information-seeking behaviour that are appropriate to use as a basis for a conceptual framework? To investigate these questions, six data collection techniques were used: participant observation (including the two sample groups of six student volunteers each—one in each classroom—as well as the entire class), pre- and post-questionnaires and self-evaluation sheets which were distributed to all of the school's grade-three students present on the days they were administered, and among the 12 sample-group students: semi-structured interviews (also conducted with the teacher and seven parents), journals (where each student could record his/her actions, thoughts and feelings), and the final student projects. (A more detailed explanation of the proposed methodology can be found in Nesset, 2005.) This paper presents some of the preliminary findings relating to the students' use of printed and Internet resources. These findings were obtained from data elicited from participatory observation as well as (to a lesser extent) from the pre- and post-questionnaires.

3. The Theme Unit/Project: "Canadian Animals in Winter"

In the younger grades of elementary school especially in classrooms applying a Project-Based Learning (PBL) approach, choosing the project that the children will research is a complex process. In PBL a class project is not considered a separate entity and is instead integrated fully into all areas of the curriculum. In fact, many educators refer to such a project as a "theme unit" and plan their lessons accordingly. For example, the project may be used to teach such things as reading and language skills, problem solving, and research methods. As a theme unit a much greater value is attributed to the project as a teaching and learning tool. Therefore, the actual information-seeking process is but one small part of the greater whole.

The teacher of the two grade-three classes involved in this study had many learning objectives she wanted the children to satisfy. As a result, her objective was to have the children learn much more than how to research a few facts about a certain topic—the topic and the activities surrounding it would serve instead as a vehicle for introducing several different cross-curricular learning objectives. She required a topic that would not only stimulate and hold the children's interest but would also effectively address and accommodate their many learning styles and intellectual abilities. It was decided that a theme unit investigating what Canadian animals do in the winter (it was given the title, 'Canadian Animals in Winter') would satisfy well the many learning criteria she required. The theme unit would culminate with a final project that the children would research together in pairs about a specific animal in which they were interested. However, before embarking on the final project the teacher spent several weeks engaging the children in different activities related to the main theme in order to prepare them for the final research project. Some examples of the preparatory activities are: creative storytelling and writing, reading aloud, vocabulary lessons, concept-mapping exercises, a guest speaker from the local Ecomuseum (a zoo-like facility that harbours animals from the surrounding area), journal entries about things such as working together in groups and the Ecomuseum visit, and group presentations on general aspects such as migration and hibernation. It was only for the latter activity and the final projects that the children were engaged in actual research, examining only printed sources for the first activity and both printed and electronic sources for the final project.

The first project that the children researched was done in groups of five or six on the topics of migration, hibernation, how animals adapt to winter, "the light sleepers", "the deep sleepers", and arctic animals. These projects took the form of posters that each group later presented to the class. Each group was given a small number of books and print-outs from websites that addressed the particular topic of study. All of these printed resources had been pre-selected and categorized by the teacher—in other words, each group was given resources that pertained directly to their particular topic. For the final project done in pairs, the students were required to choose their own books from the ones pulled from the school library (see below) and were given a few opportunities to go to the computer lab to search the Internet for information. They were also encouraged to visit their local public libraries to obtain more printed resources and to search the Internet if they did not have access to it at home. There were six questions that they were required to answer: a description of the animal and if it changed in the winter, where it lived during the winter months (for example, if it migrated and if so where it went), the animal's enemies and how it protected itself, how it survived in the winter (for example, if it remained active or hibernated), what food it ate and if it ate different things in the winter, and finally, the students were asked to give at least one interesting fact about their animal. This information was presented in the form of an individual scrapbook. Most pairs of students opted to divide the workload, each researching three of the six questions

and then copying each other's work into his/her own scrapbook. Although each student was responsible for customizing his/her own scrapbook with drawings and pictures and was partially assessed on the final product, the students were also assessed on their oral presentation of their scrapbooks to the class. This they did in pairs, both talking about what they had learned about their chosen animal while at the same time showing the class their scrapbooks.

4. The Information Resources

4.1 Computer and Internet Resources

The school was equipped with a computer lab with 23 working networked computers with filtered Internet access all of which were connected to one black and white laser printer. Most of the computers in the computer lab were older models and all but a very few ran on Windows '98 operating software. Each class was allotted from 45 minutes to one hour of computer time a week at the discretion of the classroom teacher. As there are two classes for each grade level (Kindergarten to grade six) according to the schedule the computer lab is booked most of the time, however, in reality it was often empty. The teachers of the older students often would allow them to use the computers for research during another class' scheduled time if the lab was not being used. This school did not have access to a full-time or part-time computer teacher or to a professional librarian who could teach computer literacy skills to the students; indeed, there was no link at all between the library and the computer lab—the two facilities were considered to be completely separate and were even located on separate floors. In terms of Internet availability the school network was administered at the school board level by a technician who visited only once or twice a month due to the fact that he was responsible for the IT systems of several schools located within the surrounding area. Filtering was administered at the school board's central location.

4.2 Printed Resources

In addition to the computer lab the school also has a small library which contains a collection of fiction and non-fiction books in both French and English. Each class in the school has a scheduled library period of 30 minutes per week. The library is under-resourced in several areas. It is run not by a professional librarian but instead by a library technician who divides her time equally between two schools (two and one-half days per week at each school). The library staff consists of parent volunteers, there is no OPAC but instead two card catalogues (one for English-language books and the other for those in French), and many of the books are old and worn.

The non-fiction books are categorized according to call numbers constructed by using the first three letter of the author's name followed by a Dewey decimal number. Few books have call numbers with Dewey numbers larger than two places after the decimal point. In addition, to facilitate browsing the shelves are clearly labelled with the general topic (for example, 'Animals' and 'Insects'). At the time of the study no specific library training (such as how to use a card catalogue) was provided for the younger children. During library time the parent volunteers usually read a short story aloud to the class and then give them a few minutes to search for books. Each child is allowed to take home one French-language and one English-language book per week. For this study all of the books about animals (written in English) were relocated from the school library to a small bookcase located in the grade-three classroom so that the children could access them outside of the scheduled library period. As both classes needed to access the books during the allotted class time, the children were not allowed to take any of these books

home with them for the duration of the final project (about six weeks). They were encouraged, however, to visit their local public library and/or to bring books from home.

5. Findings

The findings reported in this paper are obtained mainly from participant observation of the two grade-three classes while they worked on the two final projects related to the theme unit. Results from certain questions in the pre- and post-questionnaires are also relevant.

5.1 Information Seeking and Use: Printed Resources

Printed resources, the vast majority which were books, were used throughout the theme unit and were the teacher's preferred source format for the students to use. For the first project that was done in groups of five or six, she had pre-selected several books (as well as a few printouts she had found on an educational site for children on the Internet) on the various topics the students were to research. All of the books and print-outs were written at a grade-three (or lower) reading level. Because the books were written at such a basic level and targeted a very specific subject such as migration or hibernation, very few contained indexes and some did not even have a Table of Contents. At this point of the study, observation was restricted to the 12 volunteer students, six of whom were in each class and formed one group for this project. Each of the two groups researched the topic, migration, and they each produced a poster that they presented orally to their respective classes.

Before the students even began looking through the books and print-outs in earnest, one boy glanced at an Internet print-out that was not separated into titled sub-topics; because he did not see a section of text titled "migration" he declared that it had no information to offer. This was a typical reaction of many of the students to printed resources that did not have accompanying indexes, Tables of Contents, or even pictures that would help them to more quickly locate relevant information. If the source did not have a picture on the cover that indicated what kind of information was inside, or did not have pictures distributed throughout the text so they could be located and identified by flipping through the pages, or if the source could not be accessed by means of a finding aid such as an index or Table of Contents, the children would often leave them aside in favour of a source that contained one or more of these features. It was only when the other sources (of which there were few) had been exhausted that the students would go back to them.

For the final projects, the students were able to choose the animal they wish to research. Although most of the pairs chose the same animal and divided the work amongst themselves a couple of pairs chose to each research their own animal. In these cases, the students were pairs in name only as they essentially did individual projects. The teacher did not pre-select and hand out appropriate books for this project although she did have a number of Internet print-outs on several different animals that she made available to the students. All of the potentially relevant English-language books from the library had been placed on a small three-shelf bookcase in the classroom and each pair was allowed to choose up to two books to use at a time with the understanding that another pair might need to use them for part of the time as well. Because most of the books were not geared specifically at beginning readers and a specific topic (many of them were general reference books about North American mammals, predators, etc.) again, as with the Internet sheets in the first project, students were observed tossing books to the side without looking at the indexes or Tables of Contents because the titles and covers did not

include the specific name or picture of the student's chosen animal. For example, a pair of students researching the cougar did not recognize the fact that it is a predator and that a book on North American predators would include information about it. The teacher often had to intervene to explain to the children that just because their animal was not immediately visible on the cover or by flipping through the pages (especially in the longer books) that it did not mean there was no information to be found. She encouraged them to use the index and Tables of Contents when available but the children often ignored this advice and continued to flip pages. For some students, even when they did consult an index it was often a slow process because they did not scan it quickly to locate a specific term, but instead tended to read laboriously through it.

Often, just as the students had found some relevant information within a book, the class came to an end. In order to allow easy access to the information the next time the book was needed, a sticky note was used as a temporary bookmark. Each class had a different colour of sticky note and each pair of students wrote their first names and the page number onto the bookmark which was then stuck on the appropriate page. (The page number was included in case the bookmark fell out.) This made later retrieval of the information within the books fast and efficient. Often, the teacher would photocopy several pages for the students so that they could cut out pictures and/or highlight the text in order to make notes on the information and "write it in their own words".

During the duration of the final project, the teacher and several students searched the Internet at home and brought in print-outs of information and pictures that they had retrieved. These print-outs were used much in the same way as the photocopies of pages from books in that they were highlighted and the pictures cut out and pasted into the good copy of their scrapbooks.

5.2 Information Seeking and Use: Internet

It was only for the final projects that the students were given the opportunity to use the computers in the computer lab to search the Internet for information and they were only able to access the Internet on two occasions. Observation of their activities while in the computer lab indicated that the students were all very adept at mechanical operations such as opening and closing a browser and navigating to different sites through the use of the "Back" and "Forward" arrows (the computers were never turned off but instead when not in use went into hibernation). The homepage set to open in the browser (Internet Explorer) was that of the school board. From this site the children could access a website developed by an educational professional at the board which acted as a directory to sites on various topics categorized first by grade level and then subject matter. If accessed, this site could provide links to sites containing appropriate information relevant to many of the projects but unfortunately, it was not sought out by the children, perhaps because it was buried within the large school board site and was only directly available if it had been saved onto the "Favorites" menu or if the child knew the URL. Observation showed that almost all of the students knew how to access Google by typing in the URL (several children mentioned that Google was their homepage at home) or by selecting it (and to a much lesser extent, Ask Jeeves) using the "Favorites" feature. Furthermore, if a student was unsure how to do something, s/he would ask her/his neighbour for assistance. The children's overwhelming preference for using Google when searching for information confirms the pre-questionnaire data which showed that of the 48 children who answered the question asking which search engines they used (they could tick as many choices as they wanted from a list that included Google, MSN, Yahoo, Yahooligans!, Ask Jeeves, Ask Jeeves for Kids, and/or write in another search engine if it

was not listed), 41 [85%] used Google (although 21 of these students did use one or more other search engines such as MSN [9], Yahoo [7], Ask Jeeves [6], Ask Jeeves for Kids [10]), Yahooligans! [6]), four students indicated that they did not use search engines, one used "Animal Planet", one did not know the name of the search engine she used, and another student replied that he used "adult" search engines. During the periods of observation, only one student used a subject directory to find information and he encountered difficulties when he did so. The student was looking for information on the cougar and was examining the Yahooligans! subject directory under the topic "Animals" but the word "cougar" was nowhere to be found. It was not until after the student had given up that the author discovered that the information was found under the term, "mountain lion".

In regards to the children's search queries the most popular were those that were limited to concrete terms such as the name of the animal, perhaps with the word "Canadian" and/or "winter", often generating millions of potential hits to which the students were oblivious. The students usually opted to explore only the first hits at the beginning of the results list and despite being pressed for time they often became distracted by sites that were irrelevant to their projects but that they found interesting nonetheless. For example, a pair of students looking for information on the wolverine was entranced by a site on the comic-book "X-men" character, "Wolverine". Sometimes a potentially relevant site would be blocked by the filtering software (of which the children were unaware) and an error message would appear. When this happened, the students most often would use the "Back" button to return to the hit list to try another site or very infrequently would try another search.

Although the lab contained 23 working computers once the information had been retrieved there was only one printer and neither the time nor the resources for the students to print out everything that they had found. To ensure that the students were not just printing out information without evaluating it first, the teacher instructed them to read the information available on a site to see if it was relevant. They were then to select the relevant pieces of information and use the "Selection" feature on the print menu (they had learned how to do this in a previous grade from another teacher) so as to only print the information that related directly to their projects. Most of the students observed did not bother reading the information contained on the retrieved site at all and instead evaluated the sites based on the number of pictures or the amount of text (for example, a great deal of text in small font was considered to be 'good' information especially if it was accompanied by a relevant picture). Since the computer period was so short, with only one printer it was impossible for everyone to be able to print out the information that they wanted and it was very difficult for them to take meaningful notes, especially since the children wrote very slowly and tended to want to copy word-for-word the information contained on a site. They also did not usually copy down the URL of a relevant site that they wished to access at a later time (usually at home), instead most seemed to be content to try to find it by attempting to repeat the same search strategy that they had used to find the site in the first place.

6. Discussion

6.1 Printed Resources

The use of printed resources (mostly books) was greatly encouraged by the teacher as they directly supported her learning objectives related to reading and comprehension. This is not surprising since printed resources have been part of the educational milieu for

centuries and as such have a sound place in the learning process, especially for younger students. Firstly, in order to be accepted for widespread publication, the creators of print materials need to be recognized within their fields of expertise and those who are writing material for young people must have a good understanding not only of information content suitable for their targeted age group but also of the appropriate vocabulary and syntax. This helps to minimize problems of source evaluation because published information in print has successfully completed an established verification or vetting procedure. Although young children are often not able to assess a book's authority by applying these criteria the adults in their lives, namely parents/guardians, teachers, or librarians will normally make these value judgments for them. Regrettably, the same cannot be said of a vast amount of Internet-based information which is contained in sites developed by creators with differing levels of authority and expertise. Also, printed resources can be read at a leisurely pace without fear of the connection breaking down and/or the information being lost.

Despite the fact that the vast majority of the printed resources used by the students were packaged specifically for use by children (there were a few reference books that were targeted at higher-level students but that the grade-three students found useful nonetheless) they did experience a few difficulties in accessing information relevant to their projects. Their tendency to literally judge a book by its cover and their reluctance to make use of finding aids to locate information within the books hampered their information seeking. These tendencies are similar to those reported by Shenton & Dixon (2003) who found that many children preferred to locate information by looking through the pages of a book either sequentially (one page at a time starting at the beginning) or selectively (flipping through several pages at a time). They also report that when using indexes, younger children tended to search through all of the words beginning with a certain letter in order to find a specific term, a trait that was observed in this study. These difficulties were preliminary, however, and once the children had learned how to properly use an index or consult a Table of Contents either by trial and error or by asking a friend or the teacher, the information was usually located without much trouble. The students then made notes or asked for certain pages to be photocopied so that they could be perused (and the relevant information highlighted for note-taking) at their leisure.

6.2 Internet Resources

The children faced many challenges and barriers when attempting to access the Internet that they did not face with printed resources. The main challenge was the lack of computer time allotted to them each week. Computer time was included in the English part of the curriculum and given the fact that the English teacher's daily instruction time was limited to one-half day and that this time was often interrupted by other subjects such as music and physical education (taught by other teachers), as well as activities such as the weekly library period, the teacher found it very difficult to squeeze in all of the things that were to be taught. To compensate for this, she often sacrificed computer time in order to teach on core subjects such as mathematics and language arts. This situation is similar to that indicated in the Pew Internet study where the students complained about the lack of computer time allotted for Internet research during school hours (Levin & Arafeh, 2002).

The structure of the final products produced by the two research projects (a poster and scrapbooks) discouraged use of Internet-based resources because their two-dimensional nature meant that the multi-media aspects of the Internet could not be exploited to their full potential (for example, video and sound). In the same way the structure of

assignments as a barrier to effective use of Internet resources is raised by the students in Levin and Arafeh's (2002) study. With the grade-three students the use of the Internet was hindered further because the students were just beginning to learn how to read in English and the teacher was not really interested in teaching them search techniques to retrieve electronic information that was likely not suitable for them and/or lacked the authority of a printed source.

Another barrier to information seeking on the Internet was the fact that the teacher was unfamiliar with computers and therefore did not possess some of the necessary skills needed to teach the students. In this school there was no formal program in place to teach information literacy skills in either the electronic or printed domains and even if there was a program, there was no one on staff who had the time to devote to such instruction. Thus, this part of the curriculum was left to the discretion of each individual teacher as to how s/he would approach it, if at all. While the teachers did provide basic instruction in the use of indexes and Tables of Contents, there was little or no instruction on how to search the Internet. In this particular study when the children did go to the computer lab, the teacher gave them a list of URLs of relevant sites that she had found on the Internet at home. It was up to them to either visit the listed sites by typing in the URLs (a time-consuming exercise due to their rudimentary keyboarding skills) or to try their hand at using a search engine such as Google or Ask Jeeves to try to find information for their projects. Thus for most of the students, (except for a very few who had learned a few tips on how to search the Internet from their parents/guardians at home) searching for information was largely a process of trial and error.

The school's computer network also was connected to a very restrictive filtering system that was administered by the IT technician from a central location (the school board offices). This meant that in order to access pertinent sites that had been mistakenly blocked by the filtering software a request had to be submitted to the technician so that he could manually unblock them. Because this was a time-consuming process and one that needed to be initiated by an adult it meant that many sites that the children wished to visit were unavailable for one reason or another (it was never really clear as to why a site might be blocked). A blocked site was indicated by a rather unfriendly-looking error message which prompted many students to think that they had done something wrong in their search strategy. This often led to minor frustration on the part of the students who would often hit the "Back" button to return to their hit list and then try another site. What the students (and adults) found the most frustrating was the fact that the school board network often experienced lengthy periods of downtime due to technical difficulties and was either unavailable or very slow. This latter problem, however, could have been exacerbated by the advanced age of the computers and the operating software, another complaint raised in the Levin & Arafeh (2002) study.

In regards to the children's search queries, similar to Bilal's (2000) findings in her study of middle-school students as they performed a fact-based search, the students most often used simple search strings consisting of one or more concrete terms. This also confirms one of Schacter, Chung, and Dorr's (1998) findings in their study of the searching behaviour of sixth-grade students, "that children are reactive searchers who do not systematically plan or employ elaborated analytic search strategies" (p. 847). Also, when searching the results list, the students in this study like those in Bilal's (1998) research opted to explore only the first hits at the beginning of the results list regardless of the number of hits retrieved.

When wanting to print something from the Internet the children were asked to read and then select and print only the relevant information. Although this approach sounded good in theory, in practice it really did not work well due to the fact that reading the retrieved site(s) was often a slow and laborious process as most of them were written for students with much higher-level reading skills than the grade-three students possessed. In fact, confirming previous research (Fidel, Davies, & Douglass, 1999; Perzylo & Oliver, 1992) most of the students observed did not want to bother reading the information contained on the retrieved sites at all and instead evaluated the sites based on the number of pictures or the amount of text. As a result, many of those students who were able to print out information (many did not get a chance due to lack of time) when later perusing the printed copies of the textual information they had selected realized either that the information was not at all relevant to their chosen topic and/or that it was too difficult for them to read.

6.3 Print and Internet Resources Compared

The post-questionnaire results indicate that when first looking for information for their projects, the children more often consulted books but not as often as the observational data suggest. (Of the 45 students who completed the questionnaire, only 30 children answered the question definitively by providing only one choice. Of these, 18 children [60%] consulted books first and 12 [40%] consulted the Internet.) The observational data which strongly suggested that all of the children referred to books as their first information source may be a result of the fact that it was limited only to work done in the classroom. The preference for books may also have been affected by the fact that the books were located in the classroom rather than in the library so they were easily accessible, highly visible, and the children were able to use them for extended periods of time. Furthermore, the young age of the students meant that they required a lot of guidance and help from the teacher or other adults and this was more easily accomplished when they were working with print materials than when they were intent on searching for information on the Internet. It is worth noting, however, the results for the question on where the students found the most *useful* information. Even though books had been used far more in the classroom than the Internet, of the 33 definitive answers, 16 (48%) said they found the most useful information in books and 17 (52%) said they found it on the Internet. This finding suggests that had they been given more time for Internet searching perhaps more children would have found more useful information on the Internet than in printed materials. There were, however, some important factors that may actually indicate the opposite to be true.

The students when observed using the Internet at school did not read information on the computer screen, opting instead to print it out for later scrutiny. Similarly, those that used the Internet at home often brought printed information (especially pictures) to school so that they could include it in their project scrapbook. Upon looking at some of the textual information that some students brought from home, the author noted that it was retrieved from websites developed for children and the specificity of much of it indicated that the student had been helped in some way by someone more familiar with searching the Internet for information (likely a parent/guardian or older sibling). Similarly, the teacher also produced print-outs of the information that she found on the Internet about specific animals and gave them to the students to use. Thus, the students were actually using Internet-based information much in the same way as printed resources. When asked, several students stated that for pictures they preferred the Internet to printed sources but it is unclear if they felt the same way about textual information. The students tended not to differentiate between books and print-outs—information was

information no matter what the format. They actually preferred the print-outs because they were able to mark them up and cut out the pictures, something they certainly could not do with a book unless they were provided with photocopies. Another probable explanation for the almost half-and-half split for the question regarding where the students found the most useful information is the fact that without having to use an index and often by simply typing in the name of an animal specific information could be found fairly quickly on the Internet and could even be narrowed down to information that answered a specific question regarding the chosen animal; something that the more general reference books could not provide. Of course, this does not take into account the number of irrelevant websites visited in the process, but the children seemed not to be as frustrated by this as they were when they could not easily locate their animal within a printed index.

7. Conclusions

Although the findings from this one study cannot be generalized to a much wider population, they do offer insight into the use of electronic and print sources by grade-three students and also confirm certain aspects of previous studies conducted with older children and teenagers. The grade-three students faced similar barriers to accessing the Internet at school as their older counterparts: older computers clustered in a central lab, restrictive filtering software, unreliable network connections, inadequate time allowed for Internet searching, and little or (in the case of this study) no instruction in computer literacy skills. The younger students also possessed rudimentary reading skills (which may explain why they were reluctant to read information from the computer screen) and when they were constructing search queries they tended to use only concrete terms, remaining oblivious to the huge number of hits such queries often produce. They also did not often explore the results lists beyond the first screen and tended to get distracted easily. They also had difficulties in remembering how to return to a site other than by using the "Back" button.

In print resources for the most part the children's difficulties were limited to actually finding the information located within the books. Once they had learned how to use an index or Table of Contents effectively, they were able to locate the desired information without much trouble and because the books were packaged especially for young people, the students were better able to read and understand the information contained within them. The use of bookmarks also helped them to return quickly to material that they had found previously and they were also able to trust that the information found within the books would be about animals and not about such unrelated things as sports teams or comic-book characters. The printed materials also provided the students with the opportunity to read at their own pace without fear of losing the information or being unable to return to it. This also may explain why they preferred to print out the information retrieved from the Internet.

These findings suggest that for younger grades where students are still learning to read, books are still an important information resource and should not be pushed aside or replaced by information technologies. Yet, while books offer the children a simple and uncomplicated way to read and construct meaning at their own pace, their relevance and currency depends very much on the topic under study. The Internet, on the other hand, provides current information at the click of a mouse but learning all of the processes involved in searching for, evaluating, and retrieving that information is perhaps too much to ask of a young student who is just learning how to read and has limited cognitive

abilities, prior knowledge, and experience. That said, however, the young students in this study were very proficient at the more mechanistic processes such as opening a web browser, locating and using a search engine, and navigating back and forth between the results list and various websites. Their adeptness at these procedures demonstrates that these young students should be capable of learning basic Internet searching skills. Financial resources would be well spent on a holistic information literacy program that not only teaches young students how to locate information in print and electronic resources, along with basic evaluation skills that can be applied to the Internet, but also stresses the importance of reading so that the student can construct meaning from the information and make it his/her own no matter from which milieu it comes. One thing is for sure, young students are using the Internet in ever-increasing numbers and therefore need to be taught how to use it effectively sooner rather than later. Reallocating financial resources to one form of information resource to the detriment of the other is not the answer—the answer lies in striking a balance in the acquisition of information resources (for example, subscribing to an electronic version of an encyclopaedia rather than buying an expensive print edition and conversely, buying books that specifically target young readers) and in the development of programs aimed at helping the students to learn how to effectively locate, evaluate, and use information sources (both print and electronic) at a young age. If children learn these basic skills early they will be able to carry them forward into higher levels of education all the while building upon and improving them in a process of life-long learning.

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