

Toward a Pedagogy for Using the Internet to Learn: An Examination of Adolescent Internet Literacies and Teachers', Parents' and Students' Recommendations for Educational Change

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This study observed adolescents' Internet practices as they did homework and explored student, parent and teacher views on Internet use for learning the academic disciplines. Findings revealed that instruction of the new literacies of the Internet should address strategic information searching and critical evaluation of online information. Factors of Internet use in schools are teachers' knowledge of technology, access issues, educational policy, and adult attitudes. Implications include prioritizing instruction of aspects of Internet literacy, implementing district and school initiatives targeted to enabling effective use of the Internet for learning, and transforming pedagogical frameworks of learning from fact finding tasks to inquiry processes..

Internet literacy, Information literacy, New Literacies

Purpose and Background

Today's students integrate technology into all aspects of their lives for multiple purposes, particularly socializing, entertaining and shopping (Lenhart, Madden, & Hitlin, 2005; Media Awareness Network, 2005; Organisation for Economic Co-operation and Development [OECD], 2005). Given the increasing reliance on the Internet by youth to do homework (Lenhart, Madden & Hitlin, 2005; Media Awareness Network, 2005) and the central place of the Internet in a knowledge-based economy (Leu, Kinzer, Coiro & Cammack, 2004) it becomes urgent to extend students' use of the Internet to learn the academic disciplines. Our study sought to identify skills requiring instructional support and pedagogical conditions for using the Internet to optimize students' learning of the academic disciplines. Specifically, objectives of our study were to 1) examine how youth use the Internet when they are doing homework, 2) identify the Internet skills and strategies that youth need to be taught, and 3) identify recommendations from students, teachers, and parents for using the Internet to improve learning.

In our study, we viewed Internet literacy for learning as synonymous to information literacy in online environments. Information literacy in online environments is more complex than in offline environments and includes navigating through vast amounts of information, evaluating the usefulness and integrity of information, and integrating multiple sources of information. Research is challenging the myth of technology-savvy youth and pointing to the pressing need for strategic instruction in these new literacies as well as more effective and meaningful integration of the Internet in learning (Bilal, 2000; Chung & Neumann, 2007; Coiro, 2003; Coiro & Dobler, 2007; Rowlands & Nicholas, 2008). In particular, research shows that today's youth need support in how to effectively search and locate information on the Internet, comprehend hypermediated text, critically evaluate online information, and use information in socially and ethically responsible ways (Coiro, 2003; Rowlands & Nicholson, 2008; Lawless, Shrader & Mayall, 2007; Shenton, 2007).

Several factors help explain some of the behaviors of youth Internet literacy. Background knowledge is a major factor in determining the relevancy and quality of information sources (LeBigot & Rouet, 2007). In school subjects, youth are building the background knowledge needed to make these judgments. Other research challenges the assumption that Internet expertise applies equally to all youth and is revealing other types of digital divides related to gender, development, and socio-economic status (Livingstone, 2006). Additionally, factors of Internet inquiry such as reader stance, reader beliefs, task purpose, type of text, and receptivity to changing view affect an individual's information literacy (Damico & Baildon, 2007a).

A key educational concern is how learning tasks are framed by teachers and interpreted by students. The school library field advocates inquiry-based approaches to learning (American Association of School Librarians, 2008); however, it appears that most students have a product-based and fact collection view of learning/research which is inadvertently reinforced in classroom discourse (Limburg, 2005). Limburg (1999, 2000) identified three approaches to information seeking that adolescents hold: fact-finding, finding the right answer, and scrutinizing and analyzing. She also found an interaction between students' information seeking approach and ways that students came to understand the issue they were researching (membership in the European Union). For example, fact finders gained only fragmentary knowledge of the issue, "right answer seekers" developed one perspective (primarily economic) on the issue, and the critical multi-source information seekers developed a complex ethically and politically based understanding of the issue.

The Internet revolution has had minimal effect on teaching and learning in school, creating a divide between young people's in- and out-of-school Internet usages (Lenhart, Madden, & Hitlin, 2005). Although 35% of school districts report that at least half of their teachers now use the Internet in school assignments (National School Board Association, 2007), and 68% of students report that they access the Internet at school (Rainie & Hitlin, 2008), it is unknown if schoolwork with the Internet follows conventional purposes (e.g., fact finding) or if assignments enable students to use new forms of knowledge-building such as wikis and social networks to build knowledge—activities that over half of youth engage out of school (Lenhart, Madden, Macgill & Smith, 2007). Further, it is not known if and how instructional support of the new literacies of the Internet is provided as current Internet use in schools appears to neglect advancing students' literacy strategies and skills required for the Internet (Leu, Zawilinski, Castek, Banerjee, Housand, Liu, & O'Neil, 2007). Given the relationship between computer experience and academic performance (OECD, 2005), increased effective Internet use in schools and instruction of Internet skills are both urgent

concerns. Leander (2007) found that when students were given the opportunity to use online information sources for a project, teachers assumed that, in contrast to offline print texts, “students needed a large degree of guidance directing them towards specific online texts, and that online space needed to be greatly simplified and selected” (p. 42), thus minimizing need for instruction. Schools have an enormous responsibility to address effective usage and instruction to fully support student learning of the academic disciplines.

Methodology

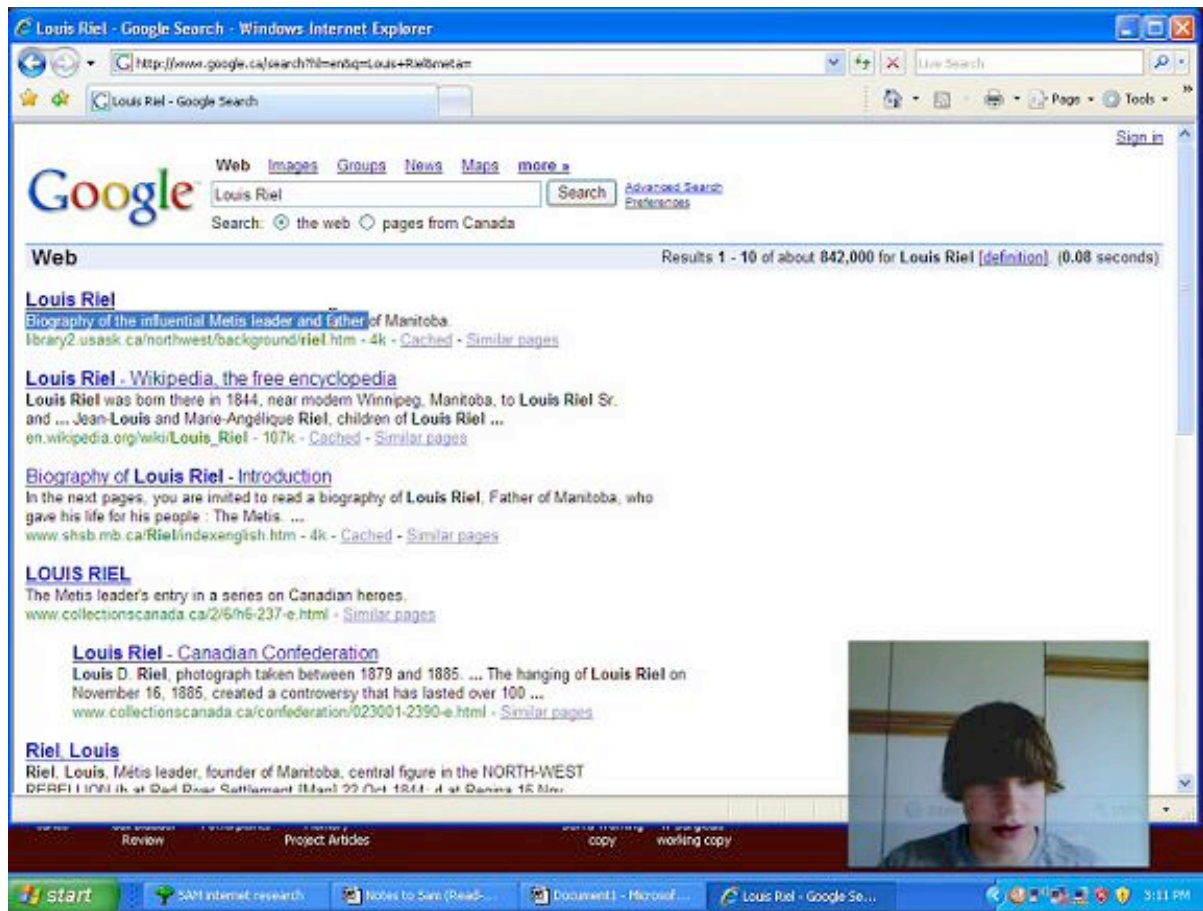
This pilot study used multiple methods (case studies, interviews and focus groups) to observe adolescents’ Internet strategies and examine student, parent and teacher views on using the Internet in school.

Case studies. Subjects were one male, Darren (age 15) and one female, Nicole (age 12 (both names are pseudonyms). Both came from homes where they had regular access to one of the family computers with high speed Internet connection. Parents of both students were professionals. Darren lived near a large university and went to the local public high school, and Nicole lived in a middle class suburb and attended the public middle school (grades 6 – 8).

Data sources were a) a record of the students’ Internet use each time they did homework within a two-week period including an oral “think aloud log”, and b) semi-structured interviews with the students and their parents. Most research about Internet literacies has used surveys, self reports and tests administered in laboratories with contrived tasks. These methods result in limited findings about complex processes such as navigating through vast amounts of unevaluated information, identifying what is important information in hyperlinked and multimedia text, and determining ethical uses of information. We used a new powerful web-based research tools to capture comprehensive and in-depth data about Internet processes while students were engaged in authentic learning activities of completing assigned homework. Morae software is designed for usability testing of software and websites and provides synchronous audio and video to record and observe users. In conjunction with the think aloud protocol, Morae allowed us to capture the complexity of students’ Internet literacy processes with much greater validity and depth than other methods we explored. Figure 1 shows an example of a frozen frame of a Morae recording.

Figure 1

Morae recording



Students were trained in their homes about how to use Morae and how to do a simultaneous think aloud. They were given ample practice time both with the researcher and independently. Students in this age group typically have research assignments that they work on both at home and in school. Our research had been planned to observe students' Internet practices over the course of an assigned research project. However, after five months of waiting for data collection to officially begin, neither student had been assigned a substantive research project. We therefore had the students record their use of the Internet anytime they did homework over a designated two-week period. Tables 1 and 2 summarize the searching and navigation behaviors of each task recorded for each student over the two-week periods.

Table 1

Tasks, Time and Navigation: Student 1 (Nicole)

Session	Task	Time (minutes.seconds)	Number of web pages visited	Number of searches conducted	Number of internal links connected to	Average time on web page (seconds)	Average time spent choosing search result (seconds)
1	Preparing book cover image with Photoshop	4.06	none	none	none	N/A	N/A
2	Finding information about a dog breed	8.11	10	2	5	36.5	1.1
3	Finding information about Cleopatra	1.0	1	1	none	15	6
4	Learning how to do an algebraic equation	3.45	7	2	3	18	4.3
5	Finding information on Operation Bernhard	6.46	3	2	1	115	2.4

Table 2

Tasks, Time and Navigation: Student 1 (Darren)

Session	Task	Time (minutes.seconds)	Number of web pages visited	Number of searches conducted	Number of internal links	Average time on web page (seconds)	Average time spent choosing search result (seconds)
1	Write a short biography on Louis Riel	11.5	3	2	1	154	34.4
2	Compare book and film of <i>To Kill a Mockingbird</i>	19.43 (approximately 10 minutes “off task”)	18	3	12 (while on task)	41.6	9.3
3	Learn about current electricity	4.58	6	7	none	26.3	3.7

Interviews with the two case study students and their parents were conducted near the end of the Morae data collection period of two weeks. Questions for students focussed on the technologies they used and their recommendations on ways of using technology to help them learn in school (Appendix A). Parent interviews addressed how the Internet helps learning, parental roles in their child’s Internet use, and use of the Internet in school (Appendix B). One focus group was conducted with five grade 8 students ages 12 and 13 (grades 6 – 8) using the same interview questions as used with the case study students. In another focus group, four teachers and one administrator from the same school discussed types of technologies students regularly use in their classrooms, what it is about those technologies and the Internet that engages them, and how student uses of these technologies (and the Internet) in school might differ from out-of-school uses (Appendix C).

Data analysis. This paper reports findings from qualitative analyses of the Morae observation data from the case study students and interview data from all participants (case study students and their parents, and focus groups of teachers and students). All observation data was coded for Internet literacy practice (locate and select; evaluate; synthesize; communicate). All interview data and the think aloud logs of the case study students were transcribed and analyzed using the constant-comparative method to identify emerging themes within the broad categories of a) Internet literacy skills requiring instruction, and b) factors of effective use of the Internet to support learning the academic disciplines.

Results

Internet skills needing instruction: Strategic searching and critical evaluation. Despite their extensive use of the Internet, students lacked skills in many areas but particularly in locating information and critical evaluation of Internet sources. Our case study students consistently began their information searches with Google (typing in

www.google.com rather than accessing it from their toolbars), then entering a very few keywords with no search markers. Wikipedia was frequently the first site to appear on their result list. They typically and rapidly selected the first hit and read a few line at the top of each website, and moved onto other sites in seconds. Clip 1 (<http://www.screencast.com/t/awJ0AEAk>) shows Nicole using broad everyday language to search on Google for a particular type of dog. Clip 2 (<http://www.screencast.com/t/dmc45hL4Wxu>) clearly demonstrates the well established practice of rapidly selecting search results from the top of the list. Clip 3 (<http://www.screencast.com/t/jgOrq8Zhds>) shows Nicole rapidly skimming several sites consistently focussing on the top of the pages she selected. Thus the overall information search pattern was Google, Wikipedia, select from top of hit list, skim the first lines, back click to the Google results, and move on to another result from the top of the hit list.

Observations of our case study students showed that their primary criteria for evaluation of websites was whether it served their information search purpose. If the site contained just the topic they were looking for, they were satisfied. At no time did either student apply criteria that they were likely introduced to in school, such as currency, authority and validity. Neither did they ever compare sources on the topic, an important aspect of critical literacy. Clip 4 (<http://www.screencast.com/t/LeiDm46xuS>) show Darren evaluating the usefulness of sites for his science assignment, but finds the information is all too complex or too simple. He concludes his textbook is the better source of information for this purpose. Clip 5 (<http://www.screencast.com/t/F3bdCBG5Ftz>) again shows Darren evaluating web resources by their usefulness for his English assignment. It's interesting that by going to a forum he indicates that public knowledge is as acceptable as "expert" knowledge. However, based on usefulness for his purpose, although he finds much interesting information about actors and films, he claims eventually that the site is "no help whatsoever."

This need for assistance in this area was echoed in student and parent interviews and students and teachers in our focus groups. One student recognized the possibility of retrieving false information, but did not have the resources to solve the problem. He admitted that many websites may be good sources, but was unsure if he could trust the information. One student wanted teachers "to give students reliable sites to go to and to tell [them] to avoid going to lesser known sites". During the interviews with the case study students they both spoke about their awareness of unreliable information on the Internet. Both students noted while they selected a Wikipedia information source that it's "always a good place to start." Parents were concerned about their children accessing credible information and wanted them to be taught to "access particular resources that are appropriate."

Teachers in our focus group felt that all teachers were responsible in helping students to be critical users of online information. They were aware of students' tendency to Google and "click and grab." They discouraged the use of Wikipedia except for one teacher who used it in a critical thinking lesson in which students were to "choose a topic, read the Wikipedia article, find something in it that's false or wrong. But as far as just straight off, using as a source for their research, no." One teacher explained how he "spent periods of time, just looking for sites and evaluating them and talking about what you look for on it. What on the web makes it credible, what doesn't make it credible? But ultimately, when they go home and do it, do they just click on anything?" The teachers agreed that providing preselected sites was the best practice as students are more productive than when left to independently search the web.

Factors of using the Internet to learn: Teacher knowledge, access, policy and attitude. As Lankshear and Knoebel (2003) found, most of our student participants thought that their technological expertise surpassed that of their teachers making it difficult for teachers to offer authentic assistance to their students. The teachers that we interviewed had varying skills and as a result used the Internet for varying purposes. The teachers that were more technologically literate tended to use newer technologies like social bookmarking and webquests with their classes. They also did not allow accessibility to prevent assigning Internet based projects, telling the kids that “not having access to a computer wasn’t an excuse” and spending some class time to “brainstorm ways that they [could] get around” accessibility issues.

Teachers with less technological expertise more easily abandoned pursuing Internet based assignment. For example, one teacher attempted to have students submit their assignments via email, but because he faces “so many problems with that, it just works easier if they are given a hard copy.” Although this teacher was willing to take the risk and time to incorporate Internet literacy in his classroom, he explained he would need much greater support from the school to continue doing so.

Indeed, a recurring theme throughout the interviews with the parents, students, and teachers was that teachers did not assign much work conducive to Internet use because of accessibility issues. The students said that their teachers felt that it was not fair to assign Internet related work when all students did not have Internet access. Teachers were frustrated with school access to computers as well. The idea of a “one-to-one program where every kid has a laptop” was favored because otherwise teachers would need regular “access to a computer lab dedicated to each class” to make it possible “to really teach the usage of those tools in an educational way.” Students recommended that they be “allowed to bring laptops to school,” to “use more computers” at school, and to “have a copy of class lessons on the school website” for students to access.

Even with improved access, time was another important issue brought up by teachers. How could they find the time to learn all these new technologies and further find the time to create innovative lessons? How could they find the time to attend workshops to help them with these issues? Again, teachers recommended greater support at the school and district level to surpass these obstacles.

At the administrative level, however, a conflict arises. Districts and schools want to promote Internet literacy but are limited by funds and by liability. They inadvertently hinder Internet literacy skills by trying to prevent bullying and trying to enhance classroom management. Our student participants regularly communicated over the web while at home, showing that the Internet could be a tool conducive to working on group projects or collaborating on homework assignments. Some districts, however, have banned communication programs and refuse students access to them. For example, both MSN messenger and Facebook were banned at the schools of the two case study participants, a national trend in North America (National School Boards Association, 2007). This supports the findings of Asselin, Early, and Filipenko (2006) and Leu, Ataya, and Coiro (2002) that the incorporation of the Internet in the school curriculum is highly limited as was borne out in our long wait to commence data collection as we were waiting for students to be assigned a project that would be conducive to Internet use. They told us that most of their homework required only the use of their textbooks.

One parent said, “I think because school doesn’t particularly see the Internet as a resource or software as a way for him [my child] to present information that he’s put together, he tends to use it for communication purposes. So he’s on MSN talking to friends, he downloads music, he plays games. So he really sees it more of as a kind of recreational space than a space for learning.” When observing the case study students, we did often see that homework sessions ended in play in the forms of games or leisurely communication (Facebook). Parents felt that districts are “remaining in a very traditional kind of textbook mindset, and they’re not really supporting students to use the Internet” and that “it’s underused by the school a great deal.” Yet at the same time, parents too were concerned about Internet predators and the dark side of the Internet. One set of parents viewed books and the Internet as polarities.

Our last finding was a peculiar one, yet epitomized our results in that it showed everyone’s limited knowledge about the Internet. Teachers, parents and students alike often mixed up the term Internet with the term computer, using it interchangeably. They often referred to activities that could be done offline as Internet activities. For example, when asking parents how their children used the Internet, we received replies such as they use it for making presentations and typing up assignments. Teachers also talked about programs like PowerPoint and Microsoft Word when asked about Internet work they assign. One student even recorded herself using Photoshop to create a picture for a school project although she was instructed to record herself while doing school work on the Internet. This confusion with the term Internet and any other computer use, shows us that feelings toward Internet use may be clouded by feelings toward general computer or technology use.

Conclusions and Educational Significance

In their study of post-secondary students’ use of digital resources, Rowlands and Nicholas (2008), concluded that there is “a desperate need for . . . educational research and inquiry into the information and digital literacy skills of our young people” (p. 32). The reasons for this research are simply that Internet literacy can significantly influence academic performance (OECD, 2005) and is a critical factor of participation in a knowledge-based economy (Leu et al, 2004). Our study extended the small but rapidly growing literature in this area. We are particularly interested in continuing to explore new methodological tools such as Morae to gain more indepth and accurate understanding of youth Internet literacy. From our pilot study, we feel there is great potential in using such innovations alongside more traditional methods as interviews and document collection. This stage of our research program was not designed to examine variables of Internet literacy abilities and quality of student learning when the Internet is the primary tool. The next stages of our research will observe students from diverse backgrounds and classrooms over longer periods of time and in a range of learning contexts. Our goal is identify most important aspects of Internet literacy for instruction and effective ways of using the Internet to support learning the academic disciplines.

Many themes surfaced during our study. Like that of Lenhart, Madden, and Hitlin (2005) and Lewis and Fabos (2005), our study found that students are using the Internet for a variety of purposes; however, participants still lacked skills in many areas of Internet literacy especially where learning was concerned. These results concur with findings of Coiro and Dobler, 2007; Guinee, Eagleton and Hall, 2003; Henry, 2006; Rowlands and Nicholas, 2008; Shenton, 2007. Students need to know how to effectively and efficiently locate and select information for their purposes. Their preference for Google indicates their comfort with it as

well its user friendliness. However, this behavior also suggests their limited knowledge of the Internet as a collection of resources from different providers, and limited knowledge of search engines and data bases, including services developed by their school libraries. Similarly, their propensity to select first level hits indicates their lack of understanding of marketing forces of search results.

Students' rapid and numerous navigations of individual sources of information accounted for significant time that students spent on the assignment whereas much less time was observed comparing across information sources and synthesizing from sources. Whereas we recognize that the ultimate goal is to have students access high quality information and that are multiple means of accomplishing (including Google and Wikipedia), nonetheless, we were troubled that not once did either of the case study students begin their searches with their school library websites which had extensive customized collections of online resources by grade and subject. We were especially concerned with the little evidence of analyzing information even using conventional criteria. There is a compelling need for multiple dimensions of critical literacy in digital learning environments such as the Internet (Kapitzke, 2003, 2005) so that students learn to evaluate techniques used to influence readers and be able to reflect on their own beliefs and values that in turn shape interpretation of information. Damico and Baidon (2007b) found little evidence of this ability in grade 8 students. However, Darren's use of public knowledge sites such as the forum he went to suggests a shift in perception of what counts as valid information.

We did not observe any use of the Internet for communicating new knowledge; both case study students predominantly engaged in information searching suggesting a fact gathering approach to their learning. However, the perceived purpose and context in which these Internet literacies are taught and practiced is what is crucial (Damico & Baidon, 2007; LeBigot & Rouet, 2007; Limburg, 1999), or new skills will continue to perpetuate old thinking. The learning tasks that Nicole and Darren undertook appeared to be structured as fact gathering, textbook-based exercises. Teachers have to find the balance between doing too much for students (by providing preselected websites) and teaching them the skills to be independent learners.

Given the shift of the information environment from finding, locating and evaluating information to one of using information, creating knowledge and sharing ideas (Todd, in press), our lack of evidence of any of these activities for school tasks was disconcerting. The teachers we interviewed indicated they were excited about what they saw their students doing on the web with these new tools and saw potential in integrating them into their teaching. However, teacher competence, user knowledge, access and policies discouraged these pedagogical advances. Team-based initiatives targeting these major factors should be implemented so that teacher knowledge, access, policy and attitude become enablers of effective instruction and use of the Internet for learning. Teacher librarians have a key role to play in such initiatives as they bring a broad knowledge of curriculum, digital learning technologies and associated policies, and information literacy. Although teacher librarians support their own profession, they are well positioned to extend their expertise to teachers, administrators and parents in all of these areas.

What it means to be literate in the 21st century is expanding rapidly and includes "proficiency with the tools of technology; ability to manage, analyze and synthesize multiple streams of information; and design and share information for global communities to meet a variety of purposes" (National Council of Teachers of English, 2008). According to the American Association of School Librarians (2008) it also means being able to

- inquire, think critically, and gain knowledge;
- draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge;
- share knowledge and participate ethically and productively as members of our democratic society;
- pursue personal and aesthetic growth.

These abilities are encompassed in expanding notions of information literacy as well. If schools are to prepare literate citizens and persons for the 21st century in the abilities that are outlined by such professional associations as the National Council of Teachers of English (2008) and the American Association of School Librarians (2008), then the ways in which information environments are changing need to be central constructs for curriculum and pedagogy. Some models are beginning to appear (Boling, Casket, Zawilinski, Barton, & Neirlich, 2008; Kapitzke, 2005; McNabb et al., 2006; Trier, 2007a & 2007b). Teacher librarians are poised to take a vital role in ensuring that students develop essential Internet literacy skills and are provided with rich contexts for using the Internet to learn the academic disciplines.

References

- American Association of School Librarians (2008). *Standards for the 21st Century Learner*. Accessed May 1, 2008, from <http://www.ala.org/ala/aasl/aaslproftools/learningstandards/standards.cfm>
- Asselin, M., Early, M., & Filipenko, M. (2006). Accountability, assessment, and the literacies of information and communication technologies. *Canadian Journal of Education*, 29 (1), 670-689.
- Bilal, D. (2000). Children's use of Yahoo!igans! Web search engine: Cognitive, physical, and affective behaviors on fact-based search tasks. *Journal of the American Society for Information Sciences*, 51, 646-665.
- Boling, E., Casket, J., Zawilinski, L., Barton, K., & Neirlich, T. (2008). Collaborative literacy: Blogs and Internet projects. *The Reading Teacher*, 61 (6), 504-506.
- Chung, J.S., & Neumann, D. (2007). High school students' information seeking and use for class projects. *Journal of the American Society for Information Science and Technology*, 58(10), 1503-1517.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(5), 458-464.
- Coiro, J., & Dobler, E. (2007). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*, 42(2), 214-257.
- Damico, J., & Baildon, M. (2007b). Examining ways readers engage with websites during think-aloud sessions. *Journal of Adolescent & Adult Literacy*, 51(3), 254-263.
- Damico, J., & Baildon, M. (2007a). Reading web sites in an inquiry-based social studies classroom. In D. Row, R. Jimenez, D. Compton, D. Dickenson Y. Kim, K. Leander, & V. Risko (Eds), *56th Yearbook of the National Reading Conference* (pp. 204-217). Oak Creek, WI: National Reading Association.
- Damico, J., & Baildon, M. (2007b). Examining ways readers engage with websites during think-aloud sessions. *Journal of Adolescent & Adult Literacy*, 51(3), 254-263.
- Guinee, K., Eagleton, M.B., & Hall, T.E. (2003). Adolescents' Internet search strategies: Drawing upon familiar cognitive paradigms when accessing electronic information sources. *Educational Computing Research*, 29(3), 363-374.
- Henry, L.A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher*, 59(7), 614-627.
- Kapitzke, C. (2005). Whose community? Which knowledge? A critical (hyper)literacies take on information literate school communities. In J. Henri & M. Asselin (Eds.), *The information literate school community: Issues of leadership* (pp. 27-38). Westport, CT: Libraries Unlimited.
- Kapitzke, C. (2003). Information literacy: Information literacy: A positivist epistemology and a politics of outformation. *Educational Theory*, 53 (1), 37-53.
- Lankshear, C., & Knobel, M. (2003). *New literacies: Changing knowledge and classroom learning*. Philadelphia: Open University Press.
- Lawless, K., Shrader, P., & Mayall, H. (2007). Acquisition of online information: Knowledge, navigation and learning outcomes. *Journal of Literacy Research*, 39(3), 289-306.
- Leander, K. (2007). "You won't be needing your laptops today." Wired bodies in the wireless classroom. In M. Knoebel & C. Lankshear, C. (Eds.), *A new literacies sampler* (pp. 25-48). New York: Peter Lang.
- LeBigot, L., & Rouet, J.F. (2007). The impact of presentation format, task, assignment, and prior knowledge on students' comprehension of multiple online documents. *Journal of Literacy Research*, 39(4), 445-470.
- Lenhart, A., Madden, M., Macgill, A., & Smith, A. (2007). *Teens and Social Media*. Pew Internet & American Life Project; Washington DC. Retrieved April 28, 2008, from http://www.pewInternet.org/pdfs/PIP_Teens_Social_Media_Final.pdf
- Lenhart, A., Madden, M., & Hitlin, P. (2005). *Pew Internet and American life project: Teens and technology*. Retrieved May 22, 2008, from http://www.pewInternet.org/pdfs/PIP_Teens_Tech_July2005_web.pdf
- Leu, D., Ayaya, R.L., & Coiro, J. (2002, December). *Assessing assessment strategies among the 50 states: Evaluating the literacies of our past or the literacies of our future?* Paper presented at the 52nd National Reading Conference, Miami, FL.
- Leu, D.J., Kinzer, C.K., Coiro, J., & Cammack, D. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R. B. Ruddell & N. Unrau (Eds.), *Theoretical models and processes of reading* (5th ed., pp. 1568-1611). Newark, DE: International Reading Association.
- Leu, D.J., Zawilinski, L., Castek, J., Banerjee, J., Housand, B., Liu, Y., & O'Neil, M. (2007). What is new about the new literacies of online reading comprehension? In A. Berger, L. Rush, & J. Eakle (Eds.), *Secondary school reading and writing: What research reveals for classroom practices* (pp.37-68). NCTE/NCRL: Chicago, IL. Retrieved May 1, 2008, from http://www.ncte.org/library/files/Store/Books/Sample/42936Chap03_x.pdf

- Lewis, C. & Fabos, B. (2005). Instant messaging, literacies, and social identities. *Reading Research Quarterly*, 40 (4), 470-501.
- Limburg, L. (2005). Informing information literacy education through empirical research. In J. Henri, & M. Asselin (Eds), *The information literate school community: Issues of leadership* (pp. 39-50). Westport, CT: Libraries Unlimited.
- Limburg, L. (2000). Is there a relationship between information seeking and learning outcomes? In C. Bruce & P. Candy (Eds), *Information literacy around the world: Advances in programs and research* (pp. 193-218). Wagga Wagga: Centre for Information Studies, Charles Sturt University.
- Limburg, L. (1999). Three conceptions of information seeking and use. In D. Wilson & D. Allen (Eds), *Exploring the contexts of information behaviour* (pp. 116-135). London: Taylor Graham.
- Livingstone, S. (2006). Drawing conclusions from new media research: Reflections and puzzles regarding children's experience of the Internet. *The Information Society*, 22, 219-230.
- McNabb, M.L. (2006). *Literacy learning in networked classrooms*. Newark, DE: International Reading Association.
- Media Awareness Network (2005). *Young Canadians in a wired world*. Retrieved May 16, 2008, from <http://www.media-awareness.ca/english/research/YCWW/index.cfm>
- National Council of Teachers of English. (2008). Toward a definition of 21st century literacies. A position statement of the NCTE Executive Committee. Retrieved March 1, 2008, from <http://www.ncte.org/print.asp?id=129117&node=65>
- National School Boards Association. (2007). *Creating and connecting: Research and guidelines on online social and educational networking*. National School Boards Association. Retrieved May 16, 2008, from <http://www.nsba.org/site/docs/41400/41340.pdf>
- Organisation for Economic and Co-operation Development (2005). *Are students ready for a technology-rich world? What PISA studies tell us*. Retrieved April 28, 2008, from http://www.oecd.org/document/31/0,2340,en_32252351_32236173_35995743_1
- Rainie, L. & Hitlin, P. (2008). *Pew Internet and American Life: The Internet at School*. Retrieved May 20 2008 from: http://www.pewInternet.org/PPF/r/163/report_display.asp
- Rowlands, I., & Nicholas, D. (2008). *Information behaviour of the researcher of the future. A CIBER Briefing Paper*. Commissioned by British Library & Joint Information Systems Committee. Centre for Information Behaviour & the Evaluation of Research (CIBER), University College London (UCL), 11 January. Retrieved May 2, 2008, from <http://www.bl.uk/news/pdf/googlegen.pdf>
- Shapiro, A., & Neiderhauser, D. (2004). Learning from hypertext: Research issues and findings. In D.H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 605-620). Mahwah, NJ: Lawrence Erlbaum.
- Shenton, A.K. (2007). The paradoxical world of young people's information behaviour. *School Libraries Worldwide*, 13(2). Retrieved May 16, 2008, from <http://www.iasl-online.org/pubs/slwl/july07-shenton.htm>
- Todd, R. (in press). Youth and their networked worlds: Research findings and implications for school libraries. In *School Libraries Worldwide*, 14(2).
- Trier, J. (2007a). "Cool" engagements with YouTube: Part 1. *Journal of Adolescent and Adult Literacy*, 50(5), 408-412.
- Trier, J. (2007b). "Cool" engagements with YouTube: Part 2. *Journal of Adolescent and Adult Literacy*, 50(7), 598-603.

Appendix A

Student Interview Questions: Case Studies and Focus Groups

1. How would you rate your skill level with using the Internet? Compared to your friends? Other people your age?
2. Tell us about what kinds of technology you regularly use in everyday (out of school) life and the purposes you use them for.
3. What is it about these technologies that make them such a part of your everyday life? What is it about the Internet that makes it a regular part of your life?
4. Describe the ways that you use the Internet (Internet access technologies) at home compared to how you use it at school.
5. What recommendations do you have for teachers about ways to use the Internet (and technologies that have Internet access) that would help you learn what you have to learn in school.

Appendix B

Interview Questions for Parents of Case Study Students

1. What do you believe about the value of the Internet in helping your child a) to learn generally, and b) to learn school subjects?
2. What is your role as a parent in your child's use of the Internet?
3. What have you observed about your child's school Internet policies? About the ways your child uses the Internet in school?
4. What recommendations do you have for schools concerning the use of the Internet in supporting student learning of school subjects?

Appendix C

Interview Questions for Teacher Focus Groups

1. What do you believe about the value of the Internet in helping students a) to learn generally, and b) to learn school subjects?
2. Tell me about the ways you have your students use the Internet to support their learning of the curriculum.
3. What challenges do educators face in integrating the Internet into teaching the curriculum?

Biographical Notes

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Statement of Originality

This statement certifies that the paper above is based upon original research undertaken by the author and that the paper was conceived and written by the author(s) alone and has not been published elsewhere. All information and ideas from others is referenced.