

Supporting the Reading of Research in Online Settings

1. Summary of Proposed Research

A good deal of the emerging research literature concerned with online information resources focuses on *information retrieval*, which is concerned with user strategies with search engines to locate desired information. This study takes up the question of what happens once readers find what they imagine they have been looking for when the subject of their search has been the research literature. It will investigate how journal websites can be designed to better support the reading of research in online settings for a wider range of readers than has traditionally been the case with research. Given that well over 75 percent of research journals now publish online, with a number of them made free to read, the reading experience and audience for research is changing. This study will look at whether the design and structure of the journal's "information environment" can improve the reading experience of expert and novice readers of this literature. It will look specifically at whether providing far richer context of related background materials for a given text than is available with print, assists the online reading process. In this way, this study seeks to better understand reading for information in online environments.

Growing out of Principal Investigator's design work in online information environments for schools, policy forums, and academic journals over the last five years, this study will evaluate whether the specific online tools and resources that journals are now able to provide can assist expert and novice readers in making greater sense and use of the research literature. By drawing on related work in reading comprehension in schools, as well as from initial design experiments with journals in online settings, it is posited that information environments that provide links to related resources will enable a wide range of readers to establish a greater context for comprehending and potentially utilizing the research they have come to read. It may also support the critical engagement of more expert readers.

This study will focus on testing a context-rich Research Support Tool which can accompany each journal article (and if proven useful can also be used with online conference papers, reports, and theses). This Tool will provide (a) background on the article and author, (b) links from each research article to directly relevant materials (based on the keywords provided by the author), and (c) opportunities for interactivity, such as commenting. Utilizing research studies in medicine and education as the publishing content to be read online, the contribution of this Tool will be assessed with a sample of faculty members and students in education and medicine, as well as well as with a sample of policymakers and members of the public.

The study will be conducted in four phases. It will include an initial trial of the Research Support Tool, followed by refinement and design improvements. It will then be assessed using think-aloud protocols and debriefing in different contexts, and will finally be tested against a control group for its contribution to reader comprehension and attitude toward research. The data will be analyzed to ascertain what elements support the quality of reading for expert and less experienced readers of research. Lessons will be drawn as to the nature of online reading, the potential readership of online research, the role of context in reading, while the study is also intended to contribute to improving the design of journals and other informational resources in online environments.

2. Detailed Description

Research Objectives

This study asks whether, by drawing on literacy research in education and utilizing new technologies, journal websites can be designed to better support the reading of peer-reviewed research and scholarship online. While the research article has retained its basic structure, from abstract to references, in moving online, a number of electronic journals are experimenting with providing readers with additional resources intended to enrich the reading experience and support the interpretation, evaluation, and utilization of this research. This study seeks to assess ways of better supporting the reading of research in online settings, not only for expert readers, but with less experienced or novice readers of research. After all, the publication of research online has opened the door on a wider readership of research made up of professionals, such as teachers and physicians, as well policymakers and interested members of the public. In interesting ways, the scholarly publishing environment has become an excellent place to test new ideas about reading and literacy, while holding the potential for supporting increasing public presence of this form of knowledge.

The Web has certainly become home for a great deal of university research, as the turn of the century saw 75 percent of scholarly journals turn to online editions, and roughly 1,000 journals publishing online alone (Tenpoir & King, 2000). As well, more of this online research is being made available to a wider public, through eprint archives and open access indexes like PubMed. A number of leading journals make their current or recent contents freely available online, from the *New England Journal of Medicine* and *British Medical Journal* to the *Educational Researcher* and *Teachers College Record*. Research is being made available online not only for faculty and students, but in many cases, for a wider public, as well as for those working in universities who have previously had little access to the research literature. It has already proven itself to be a particularly valuable source of information for people in the area of health, for example, as well as an indispensable research tool for students and teachers.

Up to this point, in the short history of the Internet, much work has been done in the information and library sciences on *information retrieval* strategies, behaviors, and technologies (Baeza-Yates & Ribiero-Neto, 1999; Nowicki, 2003). This work is taking an increasing focus on the form of *information literacy*, which has been billed as “the meta-competency of the knowledge economy” (Lloyd, 2003; Okamura, Bernstrin, & Fidler, 2002; Owusu-Ansah, 2003). Yet information literacy – “the generic skills of defining, locating and accessing information” (Lloyd, 2003, p. 87) – does not encompass a sense of *information processing*. It is not about the reading experience, as it relates to the comprehension of the materials found as a result of searching by adult readers. The research that has been done on reading online has been done largely within school contexts with educational materials (Jacobson, et al. 1996; Anderson-Inman & Reinking, 1998). While the retrieval, assessment, and comprehension of information are obviously related, the focus on search and retrieval technologies for the Web warrants comparable work on comprehension and contextualization technologies, that is, on the design of the reading environment, which is where this study takes its stand.

Derived from work in literacy and education, including that of the applicant, this

study seeks to improve our understanding of how to support and advance reading online, and in particular the reading of university-based research and scholarship as an important knowledge resource in an Age of Information. This study will show the provision of additional textual resources, which offer readers relevant contextual and background materials, will affect the reading of research online beginning with the e-journal (but with possible application to online conference papers, reports and theses). It raises this question not only for traditional readers of research, namely faculty and graduate students in the hopes of increasing the critical engagement and evaluation of this work, but also for a wider range of readers, including professionals (e.g., educators, healthcare providers, social workers, etc.), policymakers, and interested members of the public.

The Context of Study

The study proposed here comes out of the last five years of the applicant's research work with online environments, beginning with the design of project management systems for students (Willinsky & Forssman, 2000), as well as involving policy forums for teachers (Klinger, 2001), and more recently the development of a conference and a journal management and publishing system (Willinsky, in press). The philosophical and political implications of improving access to the research literature have also been explored in additional works (Willinsky, 1999; 2000; 2002). This study focuses in on improving current online journal designs which already link articles to databases of related articles and references to the source texts. Studies have shown that experienced journal readers use hyperlinking features to check references and contact authors, but these same users have also expressed a desire for improved e-journal designs, with access to deeper archival resources, as well as greater clarity on what is available to readers and an ability to move across different information "landscapes" (Tenopir, 2003, p. 21). In exploring how to meet these needs, for both expert and novice readers of research, this study draws on the reading comprehension literature, as well as taking inspiration from studies of public uses of research.

Lessons from the Reading Research

It has long been a complaint in educational research that little attention is paid to reading instruction above the primary and elementary grades (Graves, 1999). The challenge here is to turn research on teaching comprehension skills into design principles for structuring information online which readers have to, in a sense, teach themselves how to read. This study's selection of resources to provide readers with, as they read research articles draws on Graves and Graves' (1994) work on helping students call on background knowledge, relate the information to their own lives, and obtain help with the vocabulary (cf. Alexander and Jetton, 2000). For example, the reading environment created for this study will present readers with an ability to *define terms* used in the article (vocabulary help), find *media stories* (possible personal relevance), as well as access *related studies* and *related theory* (provide background knowledge). The explicit categorizing of relevant materials to consult in reading also follows on the research-based recommendations of Graves and Graves (1994), as well as Jacobson et al. (1966), to provide *scaffolding* and other forms of explicit modeling for how to read of difficult texts. The point is reinforced in Duke and Pearson's summary of the research on comprehension with its emphasis on the explicit teaching of structure, which in this study goes beyond the labeled parts of the

research article (abstract, introduction, etc.) to making the structure of interpretation and evaluation *explicit* by presenting readers with an article's peer-reviewed status, its related studies, its background theory, links to its references, and the media coverage of its implications (2002, p. 217).

The Potential Public Readership of Research

In 1999, the estimates were that 52 million Americans, or somewhat half of those who went online, had looked for health information online (Deloitte Research, 1999). The Pew Internet and American Life Project calls the online access to medical information and research an "online health revolution," which is helping "Americans take better care of themselves" (Fox & Rainee, 2000). This "new method of care" is being called by doctors, "shared decision making" (Brownlee, 2003, p. 54). *Shared decision making* sounds a lot like democracy in action, whether one thinks of a nation, a doctor's office, or a community school. It is a form of sharing that an increase in public access to medical research has made possible. Studies estimate that six million Americans go online each day in search of information about health and disease (NIH, 2003). The fact that only a portion of that information is informed by research speaks to the importance of supporting people's ability to identify and utilize peer-reviewed research. People need that support, as doctors have begun to experiment with "health information prescriptions" that guide patients to reliable sources, including the National Library of Medicine, which includes the latest medical research (*ibid.*).

In addition to this emerging public interest in health research, many professionals, including teachers and health care providers are being asked to adhere to "best practices," "evidence-based" procedures, and "knowledge translation," all of which have also led to a growing emphasis on professional and public access to research resources (Willinsky, 2001; Willinsky, 2003; Davis *et al.*, 2003). While researchers and their students will undoubtedly remain the primary readers of research -- and thus form a primary focus of this study -- this new class of readers of research not only presents an opportunity to explore the literacy development of non-expert readers, but to assist in extending the reach of public education in a way that honors people's right to know what is known.

Contribution

The intent of this study is to take advantage of this new technology to learn more about the potential reach of readers, given interest and support, as well as to learn more about what this technology can do for the circulation of knowledge. By analyzing the reading experience of a variety of readers, when it comes to the reading of research online, this study will be in a position to contribute to our understanding of the role of context and background in reading challenging texts. The study will add to our knowledge of how readers are able to integrate academic and non-academic sources of information. It will teach teachers prepare students to read and evaluate research and other information sources online. It will contribute to the evolving design of online information environments. It approaches the long-standing question on the mastery of disciplinary knowledge, which has been the principal focus in the study of advanced reading skills (Alexander & Jetton, 2000). It is also about the potential engagement and interest sparked by reading research for the layperson; it is about the level of critical engagement with the text and ideas that can be supported for expert readers.

This study is at once concerned with practical issues of developing useful tools and marshalling helpful resources that support the reading of research online, while being no less concerned with the larger efforts underway to understand literacy practices that contribute to comprehension and engagement in online settings among different readers (Lui, 2000; Reinking et al., 1998). This is not, then, a product test. The results of this study will be directed at increasing our understanding of the role that background and context play in literacy when readers face challenging texts in online settings. The study is intended to inform the design of information environments for scholarly work that can support a wider public presence for research as a source of public education, as well as advance a scholarly engagement with research, which is critical to the circulation of knowledge. Its results are directed at realizing Marc Renaud's "dream" which is "to see the social sciences and humanities reach out and help communities change the world we live in for the better" as well as to bring "more intellectuals into the public square where they can have a closer connection to the issues and concerns of the day" (2003).

Methodology

This study will work with a wide range of readers through four phases, in investigating how the reading of research online can be supported. In addition, the study will survey Highwire Press and a number of other journal publishers, on reader changing preferences between viewing articles in HTML or PDF formats, when both are present. (HTML supports the resources in question, while PDF lends itself to printing out articles.)

Research Sample: Roughly 100-130 subjects will participate across the four phases of the study. In the first three phases of the study, every effort will be made to include a balance by gender and age of (a) faculty members and graduate students in Education and Medicine, (b) policymakers in education and health portfolios (following on Willinsky, 2003), and (c) public library patrons (following on discussions with Vancouver Public Library). In Phase 4, Faculty of Education students will be used alone.

Research Content: In Phases 1-3, the research subjects will have a choice of 20 articles to read, divided between health and education. The articles will be from open access and peer-reviewed online journals, and will report research results (as opposed to editorial or position pieces) with a potential for a larger audience, while not being too highly technical or specialized, as suggested by, for example: "Self-Reported Stressful Life Events and Exacerbations in Multiple Sclerosis: Prospective Study" (Buljevac *et al.*, 2003) and "Exploring the Achievement Gap between White and Minority Students in Texas" (Linton & Kester, 2003).

Information Environment: Each online journal article will be accompanied by a *Research Support Tool* (RST) which will house the additional resources intended to support the reader. The RST is designed to provide readers with access to (a) *background materials* on the article, such as author biography, sponsor of research, keywords, peer-review status, (b) *context resources*, including both academic and non-academic sources made up of related studies, others by the authors, media, government policy, and instructional databases and (c) *interactive applets* for commenting, contacting the author, contacting others and creating a portfolio. The appropriate contextual resources provided

for each article will be distinguished by the design of a RST for each discipline area, as ERIC provides an excellent and free resource for finding related studies in education, while PubMed provides a similar service in the life sciences. The actual studies called up for the reader to consider, if they so request them, will be searched for and found in these databases automatically by utilizing the keywords provided by the author of the article, or they can be changed by the reader, given an interest in a particular aspect. The RST uses open access or free databases, so that readers do not need to belong to a research library in order to use the tool. Each article presented to the readers will also have its references linked to the full texts or abstracts if they are available online. The iterative method of this study will provide opportunities to refine and improve on the design of the RST through the three phases. The RST is designed, then, to be discipline or multi-discipline specific, and to appear with each article published in the journal, while not adding to editorial labor or costs, nor to author requirements (apart from providing keywords on submitting the article for publication).

Research Design in Four Phases and Data Analysis

1. ***Pilot Testing, with Initial Design (10-15 research subjects)***: The first phase is intended to test the basic design of the Research Support Tool (see Information Environment) to ensure that what it does makes sense and is relatively easy to use for a wide range of readers. Subjects will be led through the uses of the Tool, with the goal improving the self-explanatory, user-friendly and instructive quality of its design. This will be followed by a refinement of the RST's design for the following phase.

2. ***Think-Aloud Protocol, with Debriefing (20-30 research subjects)***: Subjects will be asked to read the article they have selected from among the 20 available, while articulating their reading processes, strategies, and choices (e.g., sources selected and method of consulting). The debriefing session that follows the reading will entail a few basic questions about their comprehension of the article, where they struggled and what had helped them in the structure of the text (abstract, etc.) or in the RST's various parts, including the academic and non-academic resources; they will be asked about how research approaches and handles such a topic; they will be asked to compare reading in this environment compared to other work they have read online, as well as what this reading experience contributed to their interest in reading research. An analysis of the patterns of use and comments, with regard to the RST will be used to further refine its design, component and functionality.

3. ***Naturalized Reading Experience, with Debriefing (20-30 research subjects)***: Subjects in this phase will be asked to read one of the selections in a place of their choice (office, home, or wherever), while being told they will be debriefed shortly after about the quality of their reading experience and their ability to comprehend the research article in this experimental online environment. Readers will be asked about whether the RST contributed to their ability to comprehend, interpret, and evaluate the article, and if so which aspects of it in particular. The scholars will be asked about what advantages and disadvantages such a publishing environment poses to critical engagement and evaluation of the work, as well as for publishing their own work in such an environment; the others will be asked about whether it serves as an incentive for further reading of research in

general and whether it increases their confidence and interest with these reading materials.

4. *Comprehension Assessment, with Control Group* (50-60 research subjects): A sample of Bachelor of Education students will be randomly assigned to a RST group (article plus RST) and a control group (same article and no RST) and provided sufficient time to read the article as well as explore related materials on the Web, with the ostensible aim of preparing to speak to the topic before a board of education meeting. They will then complete a multiple-choice and Likert-scale comprehension and attitude assessment instrument (with prior establishment of reliability and validity) which will assesses comprehension of article and context more broadly, as well as their comfort level with the research and other attitude measures toward research.

Data Analysis (Phases 2-4): The think-aloud and debriefing transcripts will be analyzed to ascertain which elements of context, background and interactivity, if any, were utilized and valued by readers (Kucan & Beck, 1997). The analysis will assess the contribution or challenge posed by the structure and components of the article, including the links from the references to the original texts. It will assess the value of the RST's presentation of relevant academic and non-academic sources, by tracking range of sources consulted, and inquiring after potential uses and applications of materials found. It will weigh issues of technical and information overload on readers, against indications of the support and interest found in these additional resources. It will pay attention to which resources support the critical engagement of expert readers – and thus can be said to augment the circulation of knowledge – and which aspects support the reading efforts of less experienced readers. Finally, with Phase 4, the comprehensions and attitude results will be assessed for significant differences for each part of the instrument, as well as the overall impact of having access to the RST.

Communication of Results

In addition to producing scholarly conference presentations and journal articles on the nature of literacy in this online environment and how online reading environments can be improved, this study will provide an open access and open source site to its findings and its design work. The Public Knowledge Project website will provide a demonstration site for the evolving versions of the Research Support Tool within a research publication environment. Related papers and publications will be posted on the site, beginning as “working papers,” and will be accompanied by a working RST that will enable readers to test for themselves the claims made, as they read the papers. The website will also include a section on study's implications for teaching critical comprehension skills with online information sources in the high schools. The RST itself will be open source software, and will be made available for others to use free of charge, as well as being included in the freely available Open Journal Systems and Open Conference Systems software, developed through previous grants, which are downloadable from the website. The Project will use the lessons drawn from this study in continuing to work with journals, conferences and educational organizations, as it has over the last five years, in supporting the implementation of systems designed to improve access to research and scholarship.

5. Training (Role of Students)

The role of graduate students in this project is extensive and is divided between the technical work performed by a Computer Science Master's student and the social science research work performed by a doctoral graduate student in Education. The computer science student will be employed to build, manage, and refine the online Research Support Tool system with the accompanying articles. The student will gain work experience in software design and coding, problem-solving with regard to client specifications and user needs, as well as obtaining skills in managing the testing and debugging process of preparing new software for release.

The doctoral student in Education will be employed to work with the users through the four phases of the research, while working with the Principal Investigator in refining the instruments and developing standardized think-aloud, observation, and interviewing techniques. These students will have opportunities to collaborate, co-author, and present together at conferences, representing the research that they have been involved in the design of and in gathering the data. The doctoral student will be using this study as a basis for a dissertation. The two graduate students will also work together in ways that will enable the transfer of skills and understanding around both the technical and social science sides of this project.

6. Previous and Ongoing Research Results

Grant Funding

A. SSHRC Standard Research Grant (2000-2003)

B. Max Bell Foundation (2000-2003),

C. John D. and Catherine T. MacArthur Foundation (2003-2004)

The research program organized around the Public Knowledge Project has been supported by three grants over the last three years. The previous SSHRC grant, which concluded in March of 2003, has enabled the development and testing of a number of prototype websites and tools, used by teachers, journalists, administrators and the public, which have allowed us to arrive at a single design for a research publishing environment, that will support both public and scholarly access, and which will be the subject of this next grant. Additionally, pilot work has been done with federal policymakers' use of the internet research resources. With the additional support of a grant from the Max Bell Foundation (2000-2003), we have been able to develop and test an initial prototype of a journal management and publishing system, Open Journal Systems, as well as a Research Support Tool, which forms the focus on this study on ways of supporting the reading of research in online settings. The grants have also been used to research social issues relating to providing greater access to research, especially in terms of fostering public education and deliberative democracy. And finally, a Research and Writing Grant (2003-2004) from the John D. and Catherine T. MacArthur Foundation has permitted an assessment of the value of such systems for universities, scholars, and students in developing countries, as well as supporting the completion of the book, *The Case for Open Access to Research and Scholarship* (in press-a).

Related Publications to Grants

- Klinger, S. (2000). *"Are they talking yet?": Online discourse as political action*. Paper presented at the Participatory Design Conference, CUNY, New York.
- Klinger, S. (2001). *"Are they talking yet?": Online discourse as political action in an education policy forum*. Unpublished doctoral dissertation, University of British Columbia.
- Korteweg, L. (2001). Inverted Hollywood: The Pitch for e-Knowledge meets Pre-Service Teacher Education. In Barrie Barrell (Ed.), *Technology, Teaching and Learning: Issues in the Integration of Technology*. Calgary, AB: Detselig.
- Korteweg, L., and Koote, J. (2001). *Tools for Organizing Professional Web Resources*. Paper presented at Horizons Conference, Whistler, BC.
- Mitchell, J. M. (2001). Education Studies Online. In *Computer technology in teacher education: Tool for communication, medium for inquiry, object of critique* (pp. 84-122). Unpublished doctoral dissertation, University of British Columbia.
- Willinsky, J. (in press-a). *The case for open access to research and scholarship*. Cambridge, MA: MIT Press.
- Willinsky, J. (in press-b). Postcolonial access to knowledge: What are our responsibilities? In D. Melunga (Ed.) *Postcolonialism and education: Challenging canons and disrupting traditions*. New York: Palgrave..
- Willinsky, J. (in press-c). Open access: Reading (research) in the Age of Information. In C. M. Fairbanks, J. Worthy, B. Maloch, J.V. Hoffman, and D.L. Schallert, 51st

- National Reading Conference Yearbook*. Oak Creek, WI: National Reading Conference.
- Willinsky, J. (2003). Scholarly associations and the economic viability of open access publishing, *Journal of Digital Information* 4(2). Retrieved October 6, 2003, from <http://jodi.ecs.soton.ac.uk/Articles/v04/i02/Willinsky/>.
- Willinsky, J. (2003). Policymakers' use of online academic research. *Education Policy Analysis Archives*, 11(2). Retrieved October 6, 2003, from <http://epaa.asu.edu/epaa/v11n2/>.
- Willinsky, J. (2002). The copyright contradictions of scholarly publishing. *First Monday*, 7(11). Available at http://www.firstmonday.dk/issues/issue7_11/willinsky/index.html. Reprinted in the *ICFAI Journal of Intellectual Property Rights*, 11(2), 2003, 61-72.
- Willinsky, J. (2002). Education and democracy: The missing link may be ours. *Harvard Educational Review*, 72(3), 367-392.
- Willinsky, J. (2001a). The Strategic Education Research Program and the public value of research. *Educational Researcher*, 30(1), 5-14.
- Willinsky, J. (2001). Extending the prospects of evidence-based education. *IN>>SIGHT*, 1(1), 23-41.
- Willinsky, J. (2000). Proposing a knowledge exchange model for scholarly publishing. *Current Issues in Education*, 3(6). Retrieved October 6, 2003, from <http://cie.ed.asu.edu/volume3/number6/>.
- Willinsky, J., and Wolfson, L. (2001). The indexing of scholarly journals: A tipping point for publishing reform? *Journal of Electronic Publishing*, 7(2). Retrieved October 6, 2003, from <http://www.press.umich.edu/jep/>.

7. Budget Justification

The majority of the funding requested for this project is for supporting a Master's student in Computer Science and a doctoral student in Education who will work in close conjunction in seeing it through with the Principal Investigator. Given that the aim is to bring the students in on all aspects of the project, with them each taking on a major responsibilities throughout the three years in seeing this project through to completion, they will be paid stipends, as stipulated under Personnel Costs in the Standard Research Grants Instructions (with the full-time master's student of \$12,000 per year and doctoral student of \$15,000). The computer science graduate student will undertake the technical development, testing and refinement of this new information environment, as well as maintain an evolving demonstration website throughout the life of the project. Although given the three years duration, it may well be necessary to hire a second Master's student when the first one completes her program before the work is done. The intent with the doctoral student in Education is that the research will form the students' dissertation work. The student will conduct research on how this information environment affects readers (concentrated in conducting, compiling, transcribing and analyzing the survey, interviews, case studies, workshops, and usability testing with a wide range of participants).

Additional funds, under Professional/Technical Services, are requested for a graphic designer to provide a professional quality design for the information environment in which the research that will be read is presented, with special attention paid to the design of the Research Support Tool. The aim here is to minimize the interference of a poor "look and feel" on the use of this resource and the general reading experience. It is expected that the graphic designer will work on the initial and final designs through the first two years of the project. The estimate obtained for the costs include consultation, proposal, technical rendering, testing, and refinement through both initial and final design phases. The resulting graphic design will provide a much-needed contribution to the larger question of how to layout an effective information environment for reading online, given the persistent lack of quality design elements in the publishing of research online.

Finally, funds are requested for dissemination, with a focus on providing support to attend major conferences, such as CSSE and AERA, as well as computer science conferences concerned with digital libraries and electronic publishing. The aim is not only to present related papers, but also to invite researchers at the conferences, who are, after all, part of the targeted readers this project addresses, to contribute to the evaluation of the contextual and background resources, as well as the design. At the same time, of course, the website will continue to be used as a site of demonstration for this new reading environment for research, with an open invitation for readers to participate in the discussion of this work, as well as serving as an open source of dissemination for the ongoing findings of this work.

References

- Alexander, P. A., and Jetton, T. L. (2000). Learning from text: A multidimensional and developmental perspective. In Eds. M. L. Kamil, P. Mosenthal, P. D. Pearson, and R. Barr, *Handbook of reading research*, Vol III. (pp. 285-309). Mahwah, NJ.: Lawrence Erlbaum.
- Anderson-Inman, L., and Reinking, D. (1998). Learning from text in a post-typographic world. In C. R. Hynd (Ed). *Learning from text across conceptual domains* (pp. 165-191). Mahwah, NJ: Lawrence Erlbaum.
- Baeza-Yates, R., and Ribiero-Neto, B. (1999). *Modern Information Retrieval*. New York: Addison-Wesley
- Brown, G. T. L. (2003, September/October). Searching informational texts: Text and task characteristics that affect performance. *Reading Online*, 7 (2). Retrieved October 6, 2003, from http://www.readingonline.org/articles/art_index.asp?HREF=brown/index.html
- Brownlee, S. (2003, March 16). *The Perils of Prevention*. *New York Times Magazine*.
- Buljevac, D., Hop, W. C. J., Reedeker, W., Janssens, A. C. J. W., van der Meché, F. G. A. van Doorn, P. A., and Hintzen, R. Q. (2003). Self reported stressful life events and exacerbations in multiple sclerosis: prospective study. *British Medical Journal* 327(646). Retrieved October 6, 2003, from <http://bmj.bmjournals.com/cgi/content/abridged/327/7416/646>.
- Davis, D., Evans, M., Jadad, A., Perrier, L., Rath, D., Ryan, D., Sibbald, G., Straus, S., Rappolt, S., Wowk, M., and Zwarenstein, M. (2003). The case for knowledge translation: shortening the journey from evidence to effect. *British Medical Journal* 327: 33-35. Retrieved October 6, 2003, from <http://bmj.bmjournals.com/cgi/content/full/327/7405/33>
- Deloitte Research. (1999). *The emergence of the e-health consumer*. New York: Deloitte Touche.
- Fox, S., and Rainee, L., (2000). *The online health care revolution: How the Web helps Americans take better care of themselves*. Washington, DS: Pew Internet and American Life Project. Retrieved October 6, 2003, from <http://www.pewinternet.org/reports/toc.asp?Report=26>.
- Graves, M. (1999). Fostering high levels of reading and learning in secondary students: An invited commentary. *Reading Online*, www.readingonline.org
- Graves, M. F., and Graves, B. B. (1994). *Scaffolding reading experience: Designs for student success*. Norwood, MA: Christopher-Gordon.
- Gunderson, L., and Anderson, J. (1999). An exploration of Internet access for literacy teachers and learners. In J. Blanchard (Ed.), *Educational computing in the schools: Technology, communication, and literacy* (pp. 5-11). New York: Haworth.
- Jacobson, M. J., Maouri, C., Mishra, P., and Kolar, C. (1996). Learning with hypertext learning environments: Theory, design, and research. *Journal of Educational Multimedia and Hypermedia*, 5(3/4), 239-281. Retrieved October 6, 2003, from <http://emergentdesigns.com/mjjacobson/publications/JEMH96/JEMH96.html>.
- Kucan L., and Beck, I. L. (1997). Thinking aloud and reading comprehension research: Inquiry, instruction, and social interaction. *Review Of Educational Research* 67

- (3): 271-299.
- Leu, D. Jr. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, and R. Barr (Eds). *Handbook of reading research* (vol. 3) (pp. 743-770). Mahwah NJ; Lawrence Erlbaum.
- Linton, T. H., and Kester, D. (2003, March 14). Exploring the achievement gap between white and minority students in Texas: A comparison of the 1996 and 2000 NAEP and TAAS eighth grade mathematics test results, *Education Policy Analysis Archives*, 11(10). Retrieved October 6, 2003, from <http://epaa.asu.edu/epaa/v11n10/>.
- Lloyd, A. (2003). Information literacy: The meta-competency of the knowledge economy? An exploratory paper. *Journal Of Librarianship And Information Science* 35 (2): 87-92 JUN 2003.
- McKenzie, J. (1998, September) Grazing the net: Raising a generation of free range students. *Phi Delta Kappan*. Retrieved October 6, 2003, from <http://www.fno.org/text/grazing.html>
- National Institutes of Health (NIH). (2003, March 18). *The Health Information Prescription*. Washington: National Library of Medicine. Retrieved October 6, 2003, from http://www.nlm.nih.gov/news/press_releases/GAhealthRX03.html.
- Nowicki, S. (2003). Student vs. search engine: Undergraduates rank results for relevance. *Portal-Libraries and the Academy* 3 (3): 503-515 JUL 2003
- Okamura, K., Bernstrin, J., and Fidler, A. T. (2002). Assessing the quality of infertility resources on the World Wide Web: Tools to guide clients through the maze of fact and fiction. *Journal of Midwifery and Women's Health*, 47(4), 264-268.
- Owusu-Ansah, E. K. (2003). Information literacy and the academic library: A critical look at a concept and the controversies surrounding it. *Journal of Academic Librarianship* 29 (4): 219-230.
- Perkins, D. (1992). *Smart schools: From training memories to educating minds*. New York: Free Press.
- Reinking, D., McKenna, M. C., Labbo, L. D., and Keiffer, R. D. (Eds.), (1998). *Handbook of literacy and technology*. Mahwah, NJ: Lawrence Erlbaum.
- Renaud, M. (2003). *University and community*. Community-University Research, CUexpo Conference, Saskatoon, Sask.
- Tenopir, C. (2003). Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies. With B. Hitchcock & A. Pillow. Washington, DC: Council on Library and Information Resources. Retrieved October 6, 2003, from <http://www.clir.org/pubs/reports/pub120/pub120.pdf>
- Tenopir, C. & King, D. W. (2000). *Towards electronic journals: Realities for scientists, librarians, and publishers*. Washington, DC: SLA Publishers.
- Willinsky, J. (in press). *The case for open access to research and scholarship*. Cambridge, MA: MIT Press.
- Willinsky, J. (2003). Policymakers' use of online academic research. *Education Policy Analysis Archives*, 11(2). Retrieved October 6, 2003, from <http://epaa.asu.edu/epaa/v11n2/>.
- Willinsky, J. (2002). Education and democracy: The missing link may be ours. *Harvard Educational Review*, 72(3), 367-392.

- Willinsky, J. (2001). Extending the prospects of evidence-based education. *IN>>SIGHT*, 1(1), 23-41.
- Willinsky, J. (2000). *If only we knew: Increasing the public value of social science research*. New York: Routledge.
- Willinsky, J. (1999). *The technologies of knowing: A proposal for the human sciences*. Boston: Beacon.
- Willinsky, J., and Forssman, V. (2000). A tale of two cultures and a technology: A/musical politics of curriculum in four acts. In C. Cornbleth (Ed.), *Curriculum, politics, policy: Cases in context* (pp. 21-48). Albany, NY: State University of New York Press.