Open Access and the Open Journal Systems: Making Sense All Over

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At a time when students are increasingly turning to the Web as their primary source of information it is well worth continuing to consider ways and means of taking advantage of this trend, and to perhaps relocate attention to traditional information sources presented in new ways. This paper makes the case that Open Access to electronic scholarly journals creates an opportunity for schools and school libraries to benefit from use of these journals. Furthermore, the article describes work being done by the Public Knowledge Project in creating a technical infrastructure for the creation and use of Web-based electronic journals through the development of the Open Journal Systems, and the ongoing development of an interactive reading environment for these journals.

Introduction

As a university teacher I often look out at my class for signs that I am connecting with the students, and for signs that they are engaging with the material being presented to them. Checking for evidence that things are sinking in often results in appeals, on my part, for comments, or perhaps direct questioning about (what I think) are the most interesting and/or salient aspects of the topic at hand. In the past, results from these quick surveys were mixed depending on, among numerous other factors, how many of the assigned readings were read, or how well presented the lecture happened to be that day. In my experience, a noticeable trend over the last few years has been a steady increase in the number of unsolicited questions and comments brought forward by students during the course of lectures. Perhaps, with increasing experience and attendance at teaching and academic growth workshops, the quality of instruction has simply gotten better. As true as this might be, an equally plausible explanation may be found in the coincident increase in the students' use of laptop computers during class. Facilitating note-taking seemed an obvious explanation at first, but the number and depth of questions really began to increase with the introduction of campus-wide wireless Internet service. Once confirmed, it became all too obvious what had happened. Students were using the Web to search for materials relevant to the topic of the lecture. They were checking facts, accessing university library resources that provided added value to the points being made in the lecture, surfing for related sites on the Web, and instant messaging with their colleagues while class was going on. The result was a manifest increase in the level of interaction with the information being covered, evidenced by an increased number of pointed, and often articulate and insightful questions and comments on the lecture material.

The purpose in relating these observations is to provide an initial context for, what are hoped to be, some useful remarks which are relevant to schools and school libraries in an era of rapid technological change and instantaneous availability of ever larger amounts of information in a globally networked environment. It is somewhat self-interested as well, as what we are experiencing in universities and colleges today is a mere reflection of the new literacies incubating in K-12.

Based on these observations it is easy to conclude that there is an eagerness on the part of students to more readily engage with information that is immediate, available, and manipulable. Although not as serious a matter at a university where research-based information sources (e.g., academic journals) are more accessible, there is also the abiding concern with what kinds of information students are availing themselves of in terms of its quality, credibility, and/or trustworthiness.

The modest suggestions that follow derive from our beliefs, goals and experiences in the Public Knowledge Project (PKP). Primary among these is the belief that more Open Access to the results of publicly-funded research will provide much greater opportunity for all members of society, and most especially students and educators, to engage with and benefit from the outcomes of this research. Furthermore, with this greater access comes an opportunity to provide platforms to further enhance engagement with the resources at a more profound level, and the capability to transform the eagerness referred to earlier into even greater, more directed interaction with, and integration of, this information.

Open Access

Definitions of Open Access abound, but the critical attributes are that a given resource be free of charge and that it be easily obtainable, usually in digital form and transmitted by electronic means (i.e., via the Internet).[i] For purposes here, it is equally important to say that Open Access does not presume a specific business model, e.g., author fee, subsidized, etc. Suber (2007), for example, suggests it not even be a fundamentally important consideration if we remain focused on the more creative and useful distinction of Open Access as a "kind of access"; a kind of access that best "scales with the growth of knowledge."

Like the streetlamps that light our city thoroughfares, knowledge, and especially knowledge created by publicly-funded research, can be viewed as a public good[ii]. Although much of the discussion surrounding the idea of more open access to research and scholarship is initiated by university-based academics wanting greater access (or in many cases reacting against declining access) to research for their own specific purposes, it is also, and perhaps more importantly, about promoting the use and integration of this knowledge into the lives of all citizens as part of public education. Willinsky (2006) refers to this as the "access principle".

> So my approach to open access is to hold to an access principle that could be put this way: A commitment to the value and quality of research carries with it a responsibility to extend the circulation of such work as far as possible and ideally to all who are interested in it and all who might profit by it. (p. xii)

As such, greater access to publicly-funded research should find its way into the mainstream of public use, including its greater use in our schools. The increasing availability of information via the Web brings much of good quality, but also much of less discernible

authority, trustworthiness, and provenance. With Open Access, school libraries could more readily 'afford' access to an increasing number of journals that provide up-to-date and credible information. Stewardship by teachers and librarians by way of making available open content that is appropriate to information literacy levels at various grades is especially important. Efforts would have to be made to integrate this kind of resource into the normal course of activities within (and beyond) the classroom as students may not engage in the use of more journal-based content on their own[iii]. Perhaps providing greater electronic access to freely available published research literature has certain limitations, but it has the one great advantage of bringing with it a more specific context of use than much of what else may be available on an otherwise amorphous Web.

The Open Journal Systems[iv]

Efforts to increase the circulation of knowledge in society (and in the classroom and school library) through greater accessibility to such things as scholarly journals through Open Access, is only one half of the equation. Of course freely available, high-quality content is essential, but so also is the means of distributing this content in a convenient, highly usable, and ultimately cost-effective manner.

Towards this end, the PKP has developed, and continues to develop, the Open Journal Systems (OJS)[v]. The purpose of OJS is to facilitate greater access to scholarly research by providing an open platform for the production and distribution of the main currency of the academic research process, the scholarly journal article. As a production system, OJS enables and supports work processes at every stage of the publication lifecycle: from initial submission to final publication. In support of PKP's central goal of increasing access to public knowledge, OJS is freely available, is locally installed and controlled, and is available in excess of 10 languages through the larger efforts of the worldwide OJS community.

Critical Engagement

An important goal within OJS is not only to provide a means to create and make accessible scholarly publications, but also to enhance the online reading experience and improve the level of critical engagement with the content of online journal articles published within the system. Critical engagement can be understood in this context as the interplay between information as encountered and the discernment, analysis, and use of that information. A major outcome of this kind of engagement is "to provide, not just access, but a basis for judgment: to move away from tutelage, and toward greater autonomy" (Willinsky, 2002, n.p.).

Typically, critical engagement involves aspects of meaning-making and comprehension and can be signified by recognition of nuance in the information presented, the ability to draw important distinctions between competing perspectives and positions, and the ability to examine and interpret evidence, cause and effect, and so on (Monroe, 2003; Salvo, 2002). Furthermore, critical engagement is viewed as a product of an "active reading" strategy that, in its ideal form, integrates the critical, interpretive, and creative aspects of information use. Looked at in another way, active reading "is the combination of reading with critical thinking and learning, and is a fundamental part of education and knowledge work" (Schilit, Golovchinsky, & Price, 1998, p. 249).

While finding related resources and moving between them is certainly an important aspect of active reading "[t]his activity of finding related materials while reading is often disconnected from the main activity. Typical information retrieval interfaces force users to suspend their reading activity to identify and then to retrieve related documents" (Schilit, Price, Golovchinsky, Tanaka, & Marshall, 1999, p. 65). A major design focus in the development of OJS is to enable the reader to keep focus on the article while at the same time enabling guided navigation to related materials that elaborate on the context of the article. As such, an attempt has been made to move from simple information retrieval toward information interaction and meaning-making.

Reading Tools

To further engage readers at the interface, and to improve the overall reading environment, a set of Reading Tools is being developed and integrated into OJS. The "working hypothesis is that a set of explicitly labeled context clues can be provided for each study that will extend the common reader's ability to find meaning and value in scholarly research" (Willinsky, 2003, p. 32). Initially, the goal was to leverage existing online resources and to provide a basic functionality that would increase the general level of engagement. More recently, development efforts have focused on creating annotation and hypertext linking components as part of the general suite of Reading Tools with the goal of facilitating even more interaction and engagement with the journal's contents.

Within OJS the Reading Tools themselves are situated as a set of grouped links on the right-hand edge of the OJS journal in HTML view. Figure 1 shows the Reading Tools in relation to a journal article presented with the default OJS stylesheet.
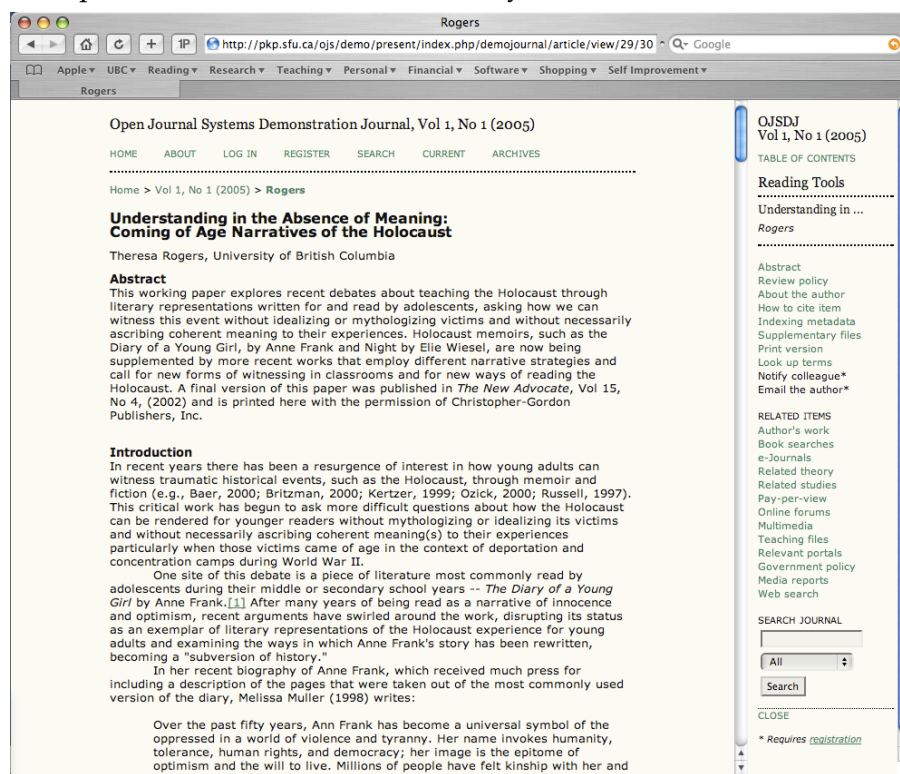

Figure 1. An Open Journal Systems journal article with Reading Tools.

The Reading Tools are divided into two major components. The first set represents access to information and services that are more structural than topical or domain specific. "Abstract", for example, provides the abstract in a separate window for those cases where the abstract is not shown as part of the article itself. "Review policy" provides information about the journal's policies for receiving and reviewing submissions, e.g., whether there is an open submission policy, whether the journal is peer-reviewed, and whether the journal is indexed by a database utility. "How to cite item" enables export of basic citation data to popular bibliographic management software (e.g., EndNote, ProCite, and Reference Manager) and aids the reader in easily exporting citation data in the early stages of the information seeking process. "Indexing metadata", includes 15 descriptive elements (based on Dublin Core). Although useful to readers in providing additional information about the article, its major purpose is to enable effective harvesting, and as a consequence to maximize resource discovery. "Supplementary files" include downloadable supporting materials associated with the article such as research instruments and datasets or spreadsheets. "About the author", "Notify colleague", and "Email the author" are mechanisms for connecting readers and authors. As it suggests, "About the author" provides useful information about the author and informs the reader of competencies and areas of specialization. "Notify colleague" provides an email client with the title of the article in the subject line, while "Email the author" provides the same functionality but with the author's email address inserted. Although not shown in this representation is a "Look up terms" link that enables the reader to easily look for definitions of terms encountered while reading the article. The reader can do so by either double-clicking on a term within the article text, or by engaging the link and entering keywords directly into the search table. Once initiated, the reader also has the ability to select from a number of open access dictionaries and encyclopedias in which to search for the definition.

The second 'Related Items' component provides for guided retrieval of resources related to the topical area of the journal. These links enable the reader to find other resources relevant to the focal article, providing a means to enhance contextual knowledge and to situate the current article, or a concept encountered in the article, within a larger framework. For example, "Author's Work" enables searching for other articles by the same author, choosing "Book Searches" will search for books that are wholly, or in part, freely available over the Internet. "Related Studies" puts the reader in touch with similar studies in related databases, while "Media Reports" provides access to related information in major news websites.

Annotation and Hypertext Linking Tools

More recently, effort has been focused on creating annotation and hypertext linking tools as part of the general suite of Reading Tools with the goal of facilitating even more interaction and engagement with the journal's contents.

Annotation has been long recognized as a fundamental component of active reading strategies. Adler (1940), in writing about books, stated that writing in the margins, between lines, and in back and front covers (a distinct form of annotation) are indispensable to reading. "[R]eading, if it is active, is thinking, and thinking tends to express itself in words, spoken or written. The marked book is usually the thought-through book" (p. 11).

Schilit et al. (1998, quoted in Miles-Board, 2004, p. 118-119) enumerate three specific advantages of the direct annotation of documents that reflect an active reading strategy:

- Convenience: Since annotations are directly integrated with the reading material, writers do not have to swap to a different tool to make statements about the content. Annotating the document in situ does not interrupt the flow of reading.

- Immersion in document context: Annotations contain more information because they occur within the "context" of a document (rather than as isolated information object).

Visual search: Annotations stand out visually in a document, allowing readers to easily scan for them
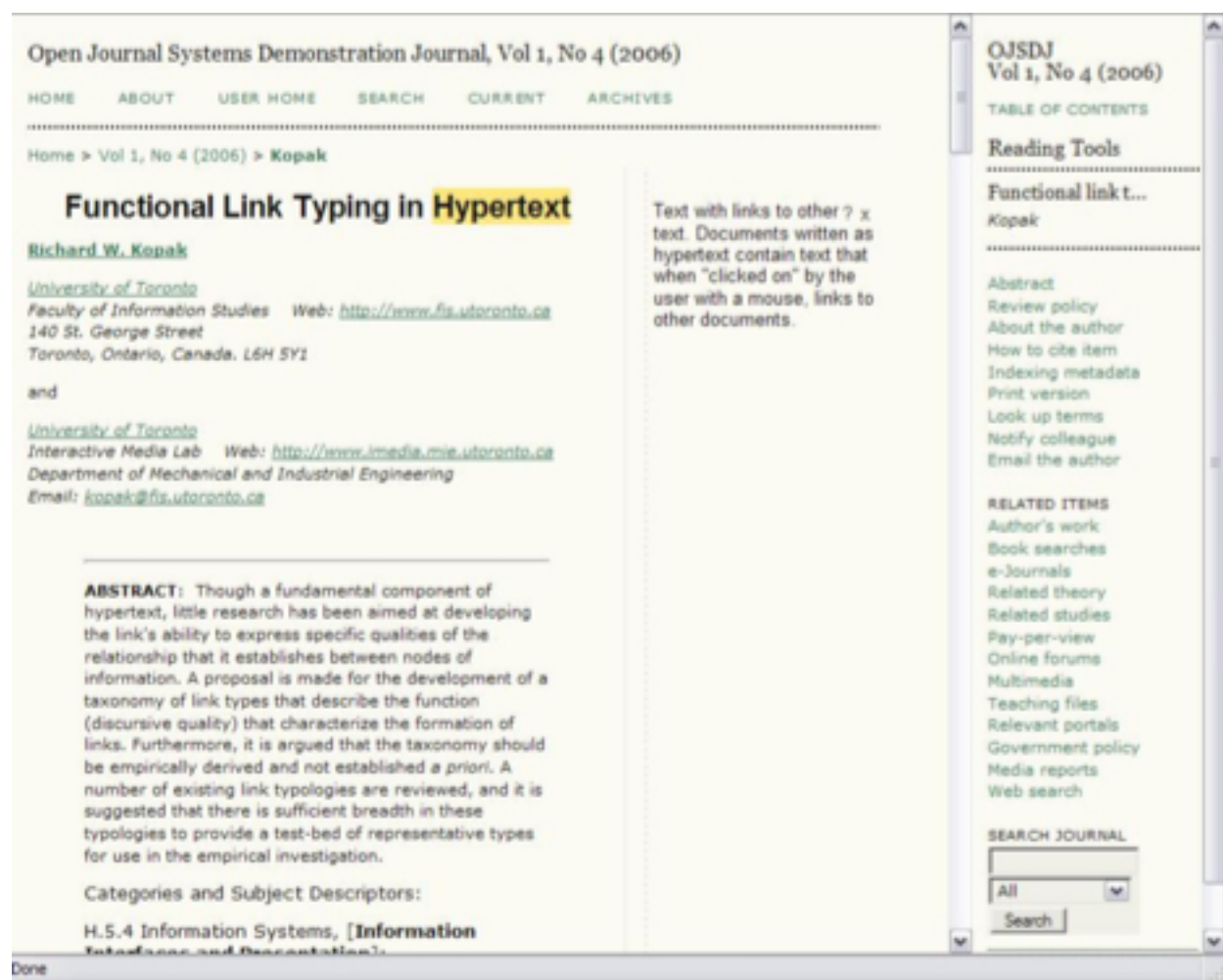

Figure 2. An OJS journal article with annotation.

The annotation area (see Fig. 2) is currently represented as marginalia. To create an annotation, the reader highlights the article text that will correspond to the annotation, and clicks on a vertical bar that activates a text box in the margin next to the area to be annotated. The reader can then enter free-form text, or cut and paste from other parts of the article, or other sources altogether. For example, a reader may want to look up a definition of a term in the text using the existing "Look up Terms" facility, cut the desired definition that is returned, and paste the definition into the annotation space.

The linking component builds on previous research (Kopak, 1999; 2000; 2002) in which a set of hypertext linktypes (a form of tagging) was developed to describe the meaning relationship (e.g., defines, illustrates, compares) between pieces of information identified within and between journal articles.

In the existing prototype, a reader can highlight a word, phrase, sentence, etc. in a given article within an OJS installation and create a hypertext link to a paragraph in another journal article. A reader can also annotate the link. Subsequently, readers become authors by creating functionally meaningful relationships between these fragments in combination with the ability to annotate those relationships. Movement through the articles within the system can be recalled and retraced with navigation guided by the purpose and role that associated information has in facilitating comprehension.

One important area of future development concerns the role of social interaction in an environment like that offered by OJS. We are interested in investigating more specifically, the role of social input to content description and navigation through both the annotation and linking components. What kinds of annotations, for example, would readers find (or not find) useful in an environment where one could contribute their annotations to a public space, to be read and responded to by other readers?

Most interestingly, we are also investigating the social construction of hypertexts via the hypertext linking tool. Our interest here is in enabling the reader to follow navigable paths through the information presented in a collection of journal articles (or other content) resulting from the socially identified and aggregated hypertext paths.

Conclusion

At a time when students are increasingly turning to the Web as their primary source of information,[vi] it is well worth continuing to consider ways and means of taking advantage of this trend, and to perhaps relocate attention to traditional information sources presented in new ways. It is likely that these new ways will need to encompass strategies of greater interactivity and engagement of the material that promotes discovery and conversation between the reader and the information.

Key here is the availability of high-quality information sources. It has been suggested that one avenue to obtaining greater amounts of this kind of information is through the increased use and support of Open Access journals that make available the intellectual capital of publicly-funded research institutions. School libraries could benefit greatly by tapping into the increasing variety and availability of high quality, no cost journals. The Directory of Open Access Journals, for example, currently lists over 3,300 journals that are "free, full text, [and] quality controlled". Subject coverage ranges from 'Arts and Architecture' to 'Languages and Literatures', to 'General Science'.

Also critical is the mode of presentation of these resources. It is clear that this mode of presentation must promote the integration of knowledge where, in the case of school-aged children and young adults, the existing knowledge base is still largely underdeveloped, and context must be supported. It must also be engaging, interactive, and increasingly social. The social component, at least in an educational setting, could be usefully leveraged through a communities of interest approach. In a 2008 essay in *Educause*, for example, John Seeley Brown

and Richard P. Adler articulate a model of "demand-pull" learning whereby students interact not only with rich supplies of information on a particular topic, but with other learners (and teachers) who are also engaged with this information.

> We now need a new approach to learning—one characterized by a demand-pull rather than the traditional supply-push mode of building up an inventory of knowledge in students' heads. Demand-pull learning shifts the focus to enabling participation in flows of action, where the focus is both on "learning to be" through enculturation into a practice as well as on collateral learning (p. 30).

The key to this approach is the ability of learners to easily communicate with others who share an interest on a particular topic, and can contribute expertise based on their own past experiences and learning. This kind of communication can be facilitated through social annotation tools like those in OJS that enable students to share interpretations of a concept in an article, ask questions about things they do not understand, propose solutions based on previous experience, pose counter arguments, or simply provide encouragement through well-placed comments. The community of interest is the virtual study group.

It is hoped that total reading (and writing) environments like those being developed in OJS will move us closer in this direction. Use of these kinds of environments in conjunction with use of greater amounts of freely accessible, research-based information might also have the salutary effect of promoting life-long learning, and help inculcate research strategies that foster this.

At a more pragmatic level, these web-based reading environments provide opportunities for students and teachers to engage in the publishing process themselves at little or no cost. Teachers are able to create journal, and journal-like resources that are age appropriate containing freely accessible materials, combined with their own contributions, obviating the need for expensive, and by virtue of that, less accessible materials.

From the students' point of view, there is also much to be gained both creatively and practically in producing their own electronic journal. Students at Gladstone Secondary School in Vancouver, for example, have used OJS to produce an annual, peer-reviewed journal volume entitled *The Pink Voice*. From their statement of Focus and Scope they declare that

> The Pink Voice is to help other youth feel comfortable with themselves by giving them tips and advice. Information given to girls by girls. Information about fashion, entertainment, social issues, drugs, love, and art. Our journal will feature stories, articles, opinions, and pictures. It will also give information about the transition from elementary school to high school (n.p.).

What better way for students to learn the value and process of research than by building their own online journal?

Notes

[i] The Budapest Open Access Initiative puts it so: "By 'open access' to this literature, we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and

distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited." Budapest Open Access Initiative (2002).

The reference to "this literature" indicates, primarily, scholarly research output from which the author expects no recompense, e.g., peer-reviewed journal articles and pre-prints. Peter Suber refers to this literature as "the lowest of the low-hanging fruit," i.e., research that is free from royalty payments and funded by public taxes.

[ii] Research and scholarship can be described as a public good if it is viewed as non-rival (consumption of a good by one does not reduce the amount available to others), and non-excludable (one cannot be excluded from using the good). Reading a book does not reduce, with each use, the amount of knowledge contained in the book. Likewise, one can be excluded from reading a book, if it is made available publicly, e.g., in a library.

[iii] In a 2006 study of high school students, Herring found that in completing a project on sound technology fully 65% of the students used information derived from websites, and 35% from more traditional print material. Among the reasons given for this preference were that websites provided information that was: faster to use, easier to understand, easier to search, easier to find information, and more information available, among others. Herring also notes that this is consistent with previous studies. See also Barranoik (2001).

[iv] Open Journal Systems is only one component in the development efforts at PKP. There is also, for example, the Open Archives Harvester, and the Open Conference Systems which is a free Web publishing tool that enables management of conferences, and management and publication of conference papers.

[v] Readers can test drive OJS using two demonstration journals available at http://pkp.sfu.ca/ojs_demo .

[vi] A 2007 study from the Pew Internet and American Life Project, *A Timeline of Teens and Technology*, reported that 90% of online young people (12-17 years) used the Internet for school research. Seventy-one percent reported that they used the Internet as the major source for their most recent major school project or report. In terms of trends it was also reported that those who have grown up with interactive media want to manipulate, remix, and share content, and that they expect to be in conversation with others about that content, i.e., access to an audience.

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