Revolutionary Reading, Evolutionary Toolmaking: (Re)development of Scholarly Reading and Annotation Tools in Response to an Ever Changing Scholarly Climate

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Abstract
As the online scholarly landscape changes, so too must the tools used to traverse it. The Public Knowledge Project (PKP) Reading Tools provides readers a bridge from online scholarly content to a host of contextual information, to a number of discipline-specific search engines and databases, and to other tools. A lot has changed since it was originally released, such as the rise of Google Scholar as the de facto starting point for many novice (and not-so novice) researchers; the blurring line between desktop and web applications; and the increased professional use of social networking tools and websites. Recently, the University of Victoria's Electronic Textual Cultures Lab (ETCL), in cooperation with the PKP, undertook a study to determine the role and value of the existing Reading Tools, particularly in the context of Humanities Computing. The ETCL has also developed a prototype Professional Reading Environment which has been the basis for substantial analysis. Rick Kopak and Chia-Ning Chiang at the University of British Columbia (UBC) have undertaken a broad survey of the online annotation landscape, and have written a proposal for developing an annotation system for PKP software. This paper discusses how, using this research as a base and in cooperation with UBC and the PKP, the ETCL has begun a large-scale redevelopment of the PKP Reading Tools, extending the current toolset to include new social networking and research tools, as well as a robust personal annotation system, making social annotation possible between small groups and the public.

Keywords
Reading tools; Text tools; Knowledge environment; Professional Reading Environment; PKP; Public Knowledge Project; Social networks

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The INKE Research Group comprises over 35 researchers (and their research assistants and postdoctoral fellows) at more than 20 universities in Canada, England, the United States, and Ireland, and across 20 partners in the public and private sectors. INKE is a large-scale, long-term, interdisciplinary project to study the future of books and reading, supported by the Social Sciences and Humanities Research Council of Canada as well as contributions from participating universities and partners, and bringing together activities associated with book history and textual scholarship; user experience studies; interface design; and prototyping of digital reading environments.

Introduction

Open Journal Systems (OJS), an online scholarly research and publication software application developed by the Public Knowledge Project (PKP), was developed "to improve both the scholarly and public quality of referred research" (Public Knowledge Project, 2009a, para 3) by providing a robust, durable, and open source online publication and dissemination platform. OJS allows journal managers to control every stage of the scholarly publication process: article submission and author management; peer review; copyediting and layout editing as well as proofreading; and final online publication. OJS can be extended via the use of additional plugins to support extra functionality, such as import/export functionality, metadata extraction and sharing, search engine optimization, and more. One of the more important areas that has been extended is that of user interaction: the point where readers visit the journal website and interact with the scholarly content therein.

Traditionally, this point of interaction online has been static and one-way: readers visit the journal website, read the article they are interested in, and leave, with perhaps a citation at most under their belt. After such a visit all the journal (and perhaps the author) has is a record of one "hit": one view of the article, maybe a notion on where that view came from geographically thanks to the journal's reporting software, but no other context for the visit, and definitely nothing in the way of reciprocal comments.

Conceived in 2001, the Reading Tools were originally developed by PKP to flesh out this point of interaction, and to create a more fruitful context for readers, journals, and authors alike (Siemens, Leitch, Blake, Armstrong, & Willinsky, 2009). They appear to the left of an article when it is viewed, and offer access to article-specific metadata, author information, and a collection of discipline-specific search databases and catalogues, while also providing opportunities for limited email-based communication (to authors and to those interested in the article at hand). The tools were developed to serve manifold purposes: not only to provide *context* of the study within the wider literature, but to provide that context to scholarly, professional, and amateur levels of research alike (Willinsky, 2003).

The Reading Tools have not changed significantly since their first implementation, and although they fulfill their original purpose, the Web doesn't stay still. Social technologies have evolved significantly in the past few years, and users expect a certain amount of networked sharing and communication between applications (Siemens, Elkink, McColl, Armstrong, Dixon, Saby, Hirsch, Leitch, Holmes, Haswell, Gaudet, Gim, Joyce, Gold, Watson, PKP, Iter, & INKE, 2011). In an online, scholarly context, there are a number of areas in which an investment in social networking tools can pay

tremendous dividends: contribution and social validation of notes and comments; commenting upon the work of others publicly, with follow-up between peers and other academics (even, presumably, the authors or the editorial team); and not to forget the rich contribution that would be this captured, public history of communication.

OJS (and the other PKP applications) provide a great publishing framework, and the Reading Tools provide a worthy first step towards further discovery and communication; with a careful development plan based on solid research, the PKP, in partnership with the Electronic Textual Cultures Lab (ETCL) at the University of Victoria (UVic), will develop an evolved, forward thinking set of tools to provide a rich social academic framework on top of published online scholarly work.

Current Reading Tools implementation

By default, the Reading Tools are disabled, and must be enabled and configured by the Journal Manager. Once enabled, they appear next to the article, nested in a frame. At its most basic, the Tools pane will display journal, issue, and article information at the top of the pane, and will have a search option at the bottom which will allow the reader to search across all journal content.

The remaining content falls into two components, which can be individually configured: Journal Item Tools and Related Item Tools. The Journal Item Tools consist of the following individually enabled tools, available by clicking the linktext:

- **Abstract**: a link to the article's abstract or details page.
- **Review Policy**: takes the reader to the journal's Review Policy section in About the Journal.
- **About the Author**: launches a pop-up window containing biographical information for all authors.
- **How to Cite Item**: launches a pop-up window where readers will be able to cycle through available citation formats. Choosing a citation style (e.g., MLA, Turabian, etc.) will display the properly formatted citation for the article, while choosing a third-party citation software type (e.g., Endnote, Procite) will present said format for download.
- **Indexing Metadata**: displays all relevant article metadata and how it corresponds to Dublin Core metadata types.
- **Supplementary Files**: displays any supplementary files and related metadata pertaining to the article.
- **Print Version**: displays just the article galley (typically HTML or PDF) without the normal journal header, footer, and reading tool components added, ready for printing. It will also initiate the reader's Print protocol.
- **Look up Terms**: provides access to online dictionaries, where any given word can be searched. (Alternatively, if the article galley is HTML, readers can double-click any word to launch the Look up Terms tool, with the clicked-upon word automatically added to the lookup box.)
- **Notify Colleague**: launches an email template pop-up window, where readers can add colleague email addresses. Suggested email body text includes a link to the article. Users must be logged in to use this feature.

- **Email the Author**: launches a pop-up window containing an empty email template; any text entered into the email body will be sent to the author. Readers must be logged in to use this feature.
- **Find References**: allows readers to search pre-selected scholarly databases for the cited work.
- **Add Comment**: allows readers to add publicly viewable comments to the article. Comments are displayed at the bottom of HTML galleys, or from the article's Abstract page.

Out of the above tools, only three could be considered "social" in nature: the Notify Colleague, Email the Author, and Add Comment tools. Furthermore, only the Add Comment tool generates a public discourse attached to the article or to the journal website – the other two tools facilitate communication *about* the article in question, but opaquely, outside of the journal website itself. Any correspondence and/or relationships between reader, author, and other potential readers are not kept: there is no historical record of the communication taking place, and the potential for further discourse is correspondingly limited.

The Related Item Tools consist of 19 groupings of searchable databases and catalogues, mostly open access, against which readers can search for further contextual information. The journal can choose only one discipline-specific "field" of Related Item Tools from the 19 default groupings (e.g., Agriculture, Biology, Education) to be used across the entire journal; however, custom groupings can be created.[1]

It should also be noted that a number of longstanding limitations inherent in the current Reading Tools implementation have been identified, and that an overhaul of the entire framework is slated to begin concurrently with annotation tool development. A full description of the prospective overhaul is outside the scope of this paper, but in short: the Reading Tools framework will be refactored into a plugin component, where each specific tool is its own plugin; the interface will be redesigned to reduce or eliminate frames-based display and facilitate the embedding of tools within articles; and the tools will allow for full multilingual capacity, similar in function to the rest of OJS.[2]

New tools: development, redevelopment, and implementation

A number of new tools have been proposed for future development alongside the comprehensive overhaul briefly described above. Most of this proposed functionality is informed by research undertaken by Rick Kopak and Chia-Ning Chiang at the University of British Columbia (UBC), and also by research at the ETCL under the directorship of Ray Siemens. Most of these new tools contain, at their most complete levels, social networking elements, although basic elements of some tools may be implemented immediately, with social aspects to follow in a later development phase.

The need for social tools

Siemens et al. (2011) identify three "exemplary tasks" associated with humanities computing (and by extension, online scholarly pursuits): "(1) the representation of archival materials; (2) analysis or critical inquiry originating in those materials; and (3) the communication of the results of these tasks" (p. 9). If the first point can be seen to correspond with the publishing within OJS of an article, the core OJS system executes the first task; the current Reading Tools execute the second, to a degree that could be improved

upon; and the third is largely unsupported save for the three useful, yet insufficient "social" tools mentioned above (Notify Colleague; Email the Author; and Add Comment).

Furthermore, Siemens et al. (2011) identify three strategies readers use as part of their research, yet which are insufficiently supported by any single social networking tool at the moment: creating an online identity by which one's work and commentary can be evaluated against another's (and through which one's scholarly reputation can be enhanced); allowing for clear connections between these identities to furnish communication, which can then be evaluated; and the management of research material, especially in a social way. These three combined aspects speak most directly to that third point above, yet they are also inherent to the development of the first and second points as well. That is, social discourse in and of itself is an integral part of further research, which in turn results in published scholarly work ("archival materials").

Annotations and Marginalia

Kopak and Chiang (forthcoming) have identified social annotation tools as a primary consideration for further scholarly communications development, and have furthermore described what such tools should look like, and how they should act and interoperate. Their survey of twenty-plus existing note and annotation tools defined four major design element categories: *highlighting*, *notemaking*, *linking*, and *workspace*, of which the first three have been identified as "an aspect of annotation rather than an expression of annotation in a more complete sense" (forthcoming, n.p.). The fourth "workspace" element is not an annotation element itself: rather, it is seen as a composition space supportive of writing notes and annotations and in the context of OJS will likely be developed outside the Reading Tools proper. However, the Reading Tools' proposed annotation tool will rely on it heavily, and so it is described along with the others below by Kopak and Chiang (forthcoming):

- **Highlighting**: Highlighting and underlining text in different colours for different purposes. Highlights should be overlappable, especially in consideration of future social annotations (pp. 4-16).
- **Notemaking**: The notemaking function will allow readers to attach a text note to the article – specifically to an anchor (e.g., a bookmark), or alternatively, to the entire document. Notes should be taggable, and should be sortable by tag and/or colour of the attached highlight or underline (pp. 16-34).
- **Linking**: The linking function will allow readers to interlink notes and bookmarks within a document to other items within the document; to other items within the journal website; or possibly to other items across the Internet. These links may optionally also describe the relationship between items (pp. 44-48).
- **Workspace**: The workspace function will give readers an area within OJS to create, organize, publish, and delete annotations and bookmarks, and in which to see the relationships and interactions between one's own items and those of other readers (pp. 35-44).

Kopak's proposed annotation design corresponds neatly with Siemens's description of an ideal scholarly social networking environment: it gives readers an environment and tools in which to promote their academic reputation, manage their research, and transform reading into knowledge; and allows for relationships between readers, researchers,

authors, and even editorial staff to be identified and nourished via linking and especially the linking of annotations with comments. The implications of this at a "local," journal/site level alone are interesting; to think of extending the reach of these tools across the existing 3,000 OJS journals (Public Knowledge Project, 2009b) and beyond is staggering.

IMPLEMENTATION

Redevelopment of the OJS Reading Tools will be split into phases to make development tasks more clear and manageable. While this article provides no firm (or even estimated) completion dates for these phases, timing will conform to the duration of the SSHRC-funded (Social Sciences and Humanities Research Council) Synergies Project[3], of which this development partnership is a subset.

Phase I will serve to familiarize the UVic development team, consisting primarily of Michael Joyce, with the OJS code[4], and will consist almost entirely of the initial implementation of annotation and marginalia tools. This implementation will be based primarily on Geof Glass's Marginalia tool (Marginalia Web Annotation 2009) and Kopak and Chiang's (forthcoming) annotation design. It should be noted that while Glass's Marginalia tool was extended to work with OJS as a plugin, thanks to the SSHRC-funded "Navigating Information Spaces" project and under the direction of Kopak, the plugin code as it currently stands is quite hefty, and deemed by the ETCL to be easier to replicate than to integrate as a maintained OJS plugin.

During this first phase, the annotation tools will be implemented at their most basic form: readers will be able to write, save, edit, and read their own annotations across a journal (or multi-journal install), and will be able to bookmark elements of a document (or the document itself); but will not be able to share their notes or bookmarks in any fashion. Additionally, a clear workspace will not yet be in place: as in the current Marginalia plugin, the annotation tools will only be available from the article itself.

Phase II development will focus on the extension of current tools into a comprehensive social network at the local (individual journal or site) level. Readers will be able to publish their annotations and bookmarks for other readers to see, and will be able to link (and describe relationships) between published items. Readers will also be able to tag their annotations, providing an additional contextual bridge between information.

A basic workspace will also be developed during Phase II. This workspace will be available from a reader's user homepage, and would list all bookmarks and notes, as well as contextual information for those items (for example, whether they have been made public, whether they are linked to, etc.). The workspace will also show common tags used by the reader and indicate whether and where other readers are using the same tags; similarly, it will show incoming links from other readers. As such, the workspace will act as a central communications hub between readers.[5] The accumulation of (1) the ability to annotate "archival materials" and (2) interpret, and subsequently manage the relationships between one's notes and others, goes a long way towards satisfying the broad outline of a full-fledged academic social networking tool, as defined by Siemens (2008), while also vastly improving Willinsky's (2003) original vision of providing a contextual framework from which to further research.

While the details of Phase III have yet to be firmed up, they will most likely focus on further Reading Tools refinement, the workspace environment, and further social networking.

For example, it is worth noting the newly-announced, Mellon-funded Open Annotation Collaboration (OAC) project (2009), which seeks to develop an online annotation specification (or set of specifications) for sharing annotations across the Web and between diverse applications and clients. The project will dedicate their first development phase to defining a digital annotation framework and to creating an environment where the framework will thrive. This and similar projects will be carefully tracked by the UVic/ PKP collaboration, and implemented if it makes sense to do so.

It is also not beyond the realm of possibility (although perhaps beyond the realm of Phase III and Synergies funding) to develop a client-server software arrangement similar to that between the PKP Harvester (Public Knowledge Project, 2005) and OJS: in other words, a standalone user/annotation server system to tie together disparate but sympathetic scholarly systems.

One other area that demands further thought is the workspace. After a basic workspace area has been developed, it can serve not only to help the reader with the research process, but, in a nascent way, to help with the *writing* process: thoughts and notes are collected and can be organized in one easy-to-manage interface. This can be further extended, with additional tools providing a "document pool" or bookshelf for notable works; clipping services to collect fragments of text and more from various resources; comprehensive document creation and editing functions further enriched by these tools; and a publication workflow to move documents from private to public. Thus, the workspace (and the associated Reading Tools) would not only assist scholarly, professional, and citizen academics in their research, but also assist in their subsequent organizing of that collected wisdom into a tangible, valuable output – ready to be fed right back into the research pool.

Conclusion

There will be significant challenges in implementing what are at the moment still very theoretical ideas on social networking and workspace development as applied to OJS and the other PKP applications. The most interesting and perhaps largest technical challenge may revolve around privacy, ownership, and access to information rights, issues that have and doubtless will continue to trouble social networking sites all across the Web. Security also becomes a much larger issue when user information sharing is considered. These are integral issues when developing an open, collaborative environment, and will be carefully considered on the way to, within, and beyond Phase III. But for the moment, we have a clear path ahead: evolutionary steps to improve what will continue to be a revolutionary tool, based on clear research and a sound design plan.

Notes

1. This description of the current Reading Tools is, by necessity, brief. More information can be found in *OJS in an Hour* (Public Knowledge Project, 2008) at pp. 81-87.

2. For more information, see Bug 2727 (Public Knowledge Project, 2009c) and the corresponding bugs that Bug 2757 blocks.

3. For further information on the Synergies Project, see http://synergiescanada.org.

4. As a sort of pre-Phase I development exercise, Michael Joyce has developed an app. This sharing tool option (http://addthis.com), currently in Concurrent Versions System (CVS), is configurable from the journal manager's Reading Tools management page. It places a "Share This" button at the bottom of an HTML article: readers can click the button and choose to share a link to the article, along with any comments, with sites such as Facebook, Slashdot, Digg, and others.

5. While this workspace area is invaluable for users who want to work with these annotation tools, as a development effort it does fall outside the Reading Tools purview and will likely not be developed as a Reading Tools-specific plugin.

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