

The Connected Scholar

Building Ideas, Communicating, and Exploring Sources Within an Online Culture of Attribution

Library Lab Proposal, submitted by: Susan Fliss, Kimberly Hall, Karen Storin Linitz

Revised in Response to Comments

April 22, 2011

Dear Library Lab Committee,

We appreciate your consideration for the Connected Scholar proposal and respond to your concerns of how the scale and costs of the project can be reduced by working with an existing commercial product. We also present two new, brief use cases demonstrating its value. Please note that we further address the innovative aspect of the Connected Scholar as an investment in an academic culture of attribution.

We have three new collaborators for the project:

Ben Gaucherin, CIO of the Law School

Dr. Laura Schlosberg, Lecturer on Slavic Languages and Literatures and Resident Dean of Mather House

Susannah Tobin, Lecturer and Director of the Legal Research and Writing Program, Law School

1) The Scale

Based on further research and consultation with HLS CIO Ben Gaucherin on the most appropriate base platform for the Connected Scholar, we have selected xWiki.

<http://www.xwiki.com/xwiki/bin/view/Home/WebHome>

XWiki is an open source, mature, commercial product. Unlike earlier wikis such as Media Wiki, this platform is an application-based wiki, meaning it is a robust and highly extensible, scalable platform. In contrast to GoogleDocs, XWiki is a platform designed for further development and functionality.

Phase I

In Phase I, we work with our own and Zotero developers to **develop a Zotero extension for xWiki**, thus incorporate the following attributes into a single collaborative space:

- Sidebar access to Harvard E-resources by subject, or customized list, or Google-like search box (we anticipate little to no development required for this - essentially an “iframed” existing resource)
- Zotero translators (hooks) allowing users to instantly select relevant sources and extract accompanying metadata from hundreds of Harvard e-resources, including, e.g., Ebsco, Factiva, HeinOnline, Google Books, Google Scholar, HOLLIS, JSTOR, Medline, Proquest, ScienceDirect, Springerlink, Web of Science, and more.
- Fully featured wysiwyg editor
- MS Word Import/Export
- Communication features

Zotero plug-ins have been designed for DokuWiki, <http://www.dokuwiki.org/plugin:zotero> as well as MS Word, OpenOffice and OfficeLibre, so we believe that this is a readily achievable integration.

To be effective, a developer will need to rapidly get up to speed on both Zotero (javascript) and xWiki (java, xml, css). Fortunately, both platforms have up-to-date and extensive documentation, as well as robust development communities.

Extensive user testing to optimize usability would follow Phase I.

Phase II and Beyond

Based on user feedback and community needs, Phase II would add other features of the original proposal, including plagiarism detection features, concept mapping, integration of existing tutorial materials, and other faculty/student-driven enhancements.

Time and Funding Required

The time and funding required is dependent on the developer's existing skills and experience with the components.

2) Use Cases and Receptivity : A Need Met through an Innovative Solution

Several colleagues on campus enthusiastically embrace the notion of such a space. Please see the need and use case described by Susannah Tobin, Lecturer on Law and Director of Legal Research and Writing at the Law School.

The Legal Research and Writing program for first-year students involves three main assignments. Students approach building their assignment in several ways. Some students make a chart or an outline listing the cases they have for the assignment, the facts, the rules and the disposition. This process makes it clear which sources they start with and where their own arguments come in to weave their own case together. Many students, however, skip directly to the writing stage, and with the Ames brief assignment, they research and write collaboratively using Google docs. Sometimes students prefer to work at the same time and even overwrite one another's work. Their resources are in Lexis-Nexis and Westlaw, where they compile .pdfs in folders. They also work from other sources found through Library databases as well as Google.

Students like the collaborative Google writing space, and the recently updated Westlaw research space is user-friendly and very appealing to students. The problem, however, is that students copy text from the pdfs and paste it into their Google docs. Unfortunately, this process can lead to student confusion when tracking the resources and subsequent citations, and the possibility of presenting a court's analysis as the student's own.

Students in the Connected Scholar are in a clean, current, composition space, similar to Google docs, that collects the meta-data of the .pdf document from which they are copying, inserting a mark and citation information. This approach not only lays the foundation for a properly cited work but raises students' awareness of the argument they are building and the argument from which they are drawing. The Connected Scholar

space helps law students reconcile their collection of cases, appropriately citing established legal arguments while weaving them together to bring out their own arguments.

Another colleague, Dr. Laura Schlosberg, Lecturer on Slavic Languages and Literatures and Resident Dean of Mather House, also describes the need that the Connected Scholar can meet with student management of library sources through their academic exercises.

Dr. Schlosberg describes how some students' working habits of exploring library and other online resources with multiple windows open on the computer can lead to academically dishonest situations. Used to working with multiple programs and windows open simultaneously, some students copy and paste excerpts they find pertinent from different sources into a separate Word document. The pasted resources can accumulate on a single Word document, sometimes without their bibliographic information. Instead of drafting from a new document and again copying the pasted excerpts as needed, with appropriate punctuation and citation, sometimes a student might begin writing around the paragraphs they have taken from other sources. Eventually, this could lead to the copied text blending in with the student's own contributions, without reference to the original source. These source excerpts can also get lost among the components the students are contributing, which, without careful editing, paraphrasing and citing, can lead to academic dishonesty issues.

Within the Connected Scholar space students can copy and paste components into the composition space with the meta-data containing citation information. This doesn't necessarily cite the sources for the student (it could with an extension), but it marks the copied excerpt with citation information. The final revision shows a pattern of marked text indicating where citations are necessary, almost like a spell-checker, suggesting students to accept and format the citation. At the composition level, students are prompted to cite. At a higher, reflective level, students can view the map of citation indicators and consider their research habits, how their own ideas develop, and how the resources support their ideas, their thesis, their argument, etc.

3) The Library Sources

Through the Connected Scholar the use of library sources becomes visible. By inserting citation information within the composition space, the program tracks the use of library and web-based sources to illustrate the development of an idea, a thesis, and an argument through the drafting and revising process. To encourage attribution through the composition process for student learning as well as for scholarly practice, the Connected Scholar:

Facilitates the creation of the bibliography. It compiles the list of collected sources within a general citation format.

Increases student awareness of one's own creative research process. It makes the idea development process visible by tracking sources through the online search and into the writing space, and then back to the search as the student explores additional sources, annotates them with her interpretation, and makes connections among them. This leaves a visible map for student reflection.

Maps how the resources are used. The tracking process highlights whether sources are quoted, cited, or paraphrased in the document. It also displays the point in the argument where the source is brought in, highlighting the role of the source.

The innovative value of the Connected Scholar is that it builds student habits *of acknowledging sources and ideas of others while collecting and drafting subsequent work*. This is critical toward encouraging the practice of attribution within an actively sustained culture of academic integrity. Through the Connected Scholar the student cultivates habits of using digital scholarship responsibly and professionally.

There are several reference management systems and citation software packages installed across libraries through popular software applications. Today's student has a new habit, encouraged by mobile technology, of acquiring online information nuggets, and through a brief, instinctive gesture of highlighting and clicking, posting them to their own works in progress or sharing and receiving it with no reference of its source. The Connected Scholar is intended to harness those habits, evident through current practices on campus, and integrate them within an online culture of attribution.

Because of the current nature of student research habits, this Library Lab project is larger than many and we understand concerns due to its size and scale. We believe, however, that the investment would be worthwhile to shape and integrate existing tools for a resource-based research and composition space that is attractive to and easily usable by Harvard students at all levels. The University currently spends millions of dollars to collect intellectual resources for students to use. This fact, combined with concerns over maintaining academic integrity, supports a significant investment in a tool like Connected Scholar.

The original proposal follows, for your reference.

Sincerely,

Susan Fliss,
Kimberly Hall
Karen Storin Linitz

The Connected Scholar

Building Ideas, Communicating, and Exploring Sources Within an Online Culture of Attribution

Library Lab Proposal, submitted by: Susan Fliss, Kimberly Hall, Karen Storin Linitz

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The Connected Scholar

Library Lab Proposal

April 1, 2011

Susan Fliss, Associate Librarian of Harvard College for Research, Teaching and Learning, FAS

Kimberly Hall, Learning Technologies Manager, HLSL

Karen Storin Linitz, Manager Teaching Learning Curriculum Solutions, HLSL

The Connected Scholar¹

*Building Ideas, Communicating and Exploring Sources
Within an Online Culture of Attribution*

Executive Summary

The Connected Scholar is an online workspace for students and scholars to draft writing projects while tracking the progression of one's ideas through exploratory, intellectual engagement with established works. This web-based writing space integrates discovery of research sources with tools for resource management and citation while offering guidance on proper source attribution. It supports the written and creative process through interaction within the space among students, instructors, librarians and writing fellows. The Connected Scholar has potential for wide application across schools and disciplines. As a result, stakeholders across the University have expressed interest and support for its potential to address demonstrated needs including attention to attribution and academic integrity, increasing and facilitating use of underutilized library resources, and integration of student support services. Finally, the tool has potential for several other purposes such as a data source for the LibraryCloud and ShelfLife projects.

Project Team Collaborators

"How soon can we have it?" – Dr. Thomas Jehn, Sosland Director of the Harvard College Writing Program, during a Connected Scholar concept presentation to selected stakeholders

Given the breadth of potential application for this project and the interest that's been expressed from units across the University, we propose to have an advisory board that would provide continuing feedback to the co-principals throughout the development process. The following Harvard personnel have agreed to serve in this capacity if the project is funded.

Terry Aladjem	Bok Center, Executive Director
Kim Dulin	HLS, Co-Director, Harvard Library Innovation Lab
Susan Fliss, Co-PI	Associate Librarian of Harvard College for Research, Teaching and Learning, FAS

¹Dante, E. (2010 Nov). The shadow scholar, *The Chronicle of Higher Education*. <http://chronicle.com/article/The-Shadow-Scholar/125329/> retrieved January 11, 2011.

Deborah Garson	GSE, Head of Head of the Research and Instruction Services and GSE Writing Program at Gutman Library
Kimberly Hall, Co-PI	HLS, Learning Technologies Manager
Michael Hemment	FAS, Head of Research and Learning Technology, Harvard College Library
Thomas Jehn	FAS, Sosland Director of the Harvard College Writing Program
Stephanie Kenen	FAS, Associate Dean of Undergraduate Education and Administrative Director of the Program in General Education
Karen S. Linitz, Co-PI	HLS, Manager Teaching Learning Curriculum Solutions
*Jane Rosenzweig	FAS, Director of the Writing Program
Carli Spina	HLS - Reference Assistant, recent practicing lawyer, graduate student in library science
Katie Vale	FAS, Director of Academic Technology Group

* Pending

The Role of the Connected Scholar

This proposal seeks to build on innovative Harvard Law School Library, Berkman Center, an Library Lab tools, and open-source products outside of the University, to track the progression of ideas as the creator searches, collects and communicates with others. *The end result is a culture of practice of crediting and understanding the value of professional attribution, as well as the interconnectedness of ideas in the world of scholarship.*

Benefits of the Connected Scholar

The benefits of the Connected Scholar span a range of creative, pedagogical and practical value. As we discussed the Connected Scholar with colleagues across the University and they contributed ideas and suggestions, we see the potential of the space as one that:

- provides an online composition space for students with a feedback/commenting mechanism for their peers, faculty, librarians and others supporting the course
- allows instructors a window to the writing processes of individual students
- provides a window for librarians and other research experts to observe how students are using specific sources, and to intervene proactively when appropriate
- delivers a range of academic support to students within the environment where they do their work
- encourages students to think about research and writing as an integrated, iterative process
- encourages students to think of their ideas as connected to a network of ideas expressed by a global community of scholars in a variety of media formats
- promotes and facilitates use of Harvard Library collections

- responds to student concerns regarding ease of access to Harvard e-resources and research guides
- potential for new roles for librarians, museum educators and other academic support staff in supporting teaching and learning
- opportunity for increased collaboration and bringing in the participation of other faculty, teaching fellows and academic support staff
- potential to collect data on how students use the tool - for example, how they connect full text resources to writing assignments, how they connect primary and secondary sources, how they connect materials in different formats, from different data sources
- allows a meta-level lens to the life of creative work at Harvard grounded in an online culture of attribution

More on the Connected Scholar

The Connected Scholar can help the writer understand one's own creative process, progress and habits of mind, resulting in meta-cognition, reflection, deeper learning and awareness.

The Connected Scholar can help shape a culture of attribution by providing a space for easy recognition of when to cite and one that produces citations at the time writers are developing their ideas. Instead of reviewing and recalling a list of sources after a project is complete, citations are tracked along the way, just in time, signaling key points in the idea or thesis development.

The Connected Scholar can provide a teaching and learning space for instructional engagement through the writing and revision process. Librarians can provide personalized assistance with identifying the right resources, synchronously or asynchronously, while better understanding the student goals for the assignment. Professors will have better access to evaluate student progress and development through the writing process, encouraging reflective and deep learning while reinforcing a culture of attribution. Writing instructors and Teaching Fellows could also be given access to this space.

The Connected Scholar can provide a space where Harvard Library e-resources are more easily discovered, accessed and exploited by writers because librarians can set up targeted resource lists directly related to the project. Rather than the student simply viewing an overly comprehensive list of e-resources and research guides, writers benefit directly from librarian expertise throughout the writing process.

Two Sample Use Cases

Case 1: A first year College student begins a writing assignment. Within the Connected Scholar writing space, the instructor has created a support community for the student by asking the

student share the workspace with his instructor, a writing fellow and a subject specialist librarian.

Depending on the assignment's learning objectives, the instructor is able to restrict the student to a closed universe of Library sources. Alternatively, the student might use Connected Scholar's automated discovery feature to generate a short list of relevant databases, based on the topic and student's level. The instructor can also allow or direct the student to confer with the librarian about the most appropriate sources. The student can upload a scanned item or other text document. The resource discovery or resource management sidebars can be hidden at any point if the student or instructor decides to simplify the environment.

Throughout the writing process, the student can receive guidance from the writing fellow via text comments. The student can also benefit from an exchange of ideas among the intersection of sources and instructor feedback. The librarian might add links to suggested databases or websites. The student can seek assistance through synchronous chat. The instructor can log in to view the student's work at any time to note progress and help guide the student.

Using the resource management sidebar, the student can organize the sources to display only those that are relevant to the section he is writing. Clicking on the name of the source displays the full text in a floating window, from which the student can copy selections, and paste them with auto-generated citation data. At the end of the writing process, the student can format this rough citation data according to MLA or other citation rules.

As the student writes, a plagiarism detection program works in the background comparing the student's text to source documents. Where there is a strong match, a pop-up prompts the student to consider a citation. Additional context-specific guidance from a tutorial is available to the student with a click on this pop-up. The sensitivity of the detection tool can be adjusted to give the student more or less decision making ability in this area, as appropriate.

Case 2: A third year law student is preparing an independent research paper comparing French and UK law on mergers and acquisitions. The student invites her professor to the writing space, along with an off-site expert on French corporate law and a foreign and international law librarian.

To find possible source material, the student enters keywords into the Primo Central search bar to the right of her document. This generates a list of available documents within Harvard e-resources and beyond. The student, who is a visually oriented learner creates an outline of the paper using the conceptual mapping feature and drags in identified source material to the resource management toolbar. Sources available in ShelfLife are flagged with a clickable icon that allows access to ShelfLife features such as the virtual shelflist, the item's "ShelfRank" and "Read This Too" offering serendipity and crowd-sourcing options for identifying additional source material.

Within the space, the librarian can answer specific research questions and offer suggestions for additional search strategies or resources. The expert can comment on a specific section of the work where the student needs clarification, and the professor might annotate the draft with instructions for revisions.

Proposed funding

- Contract developer: 240 hours at \$85/hour = \$20,400
- One year of operational support: 30 hours/month for 12 months @ \$85/hour = \$30,600
- Funds for incentives to offer focus group and usability study participants= \$1000.00

Total: \$52,000

Harvard Law School Library and Harvard College Library will contribute 5-10% each of Susan Fliss's and Karen Linitz's time and 20% of Kimberly Hall's time for the project management and coordinating focus groups.

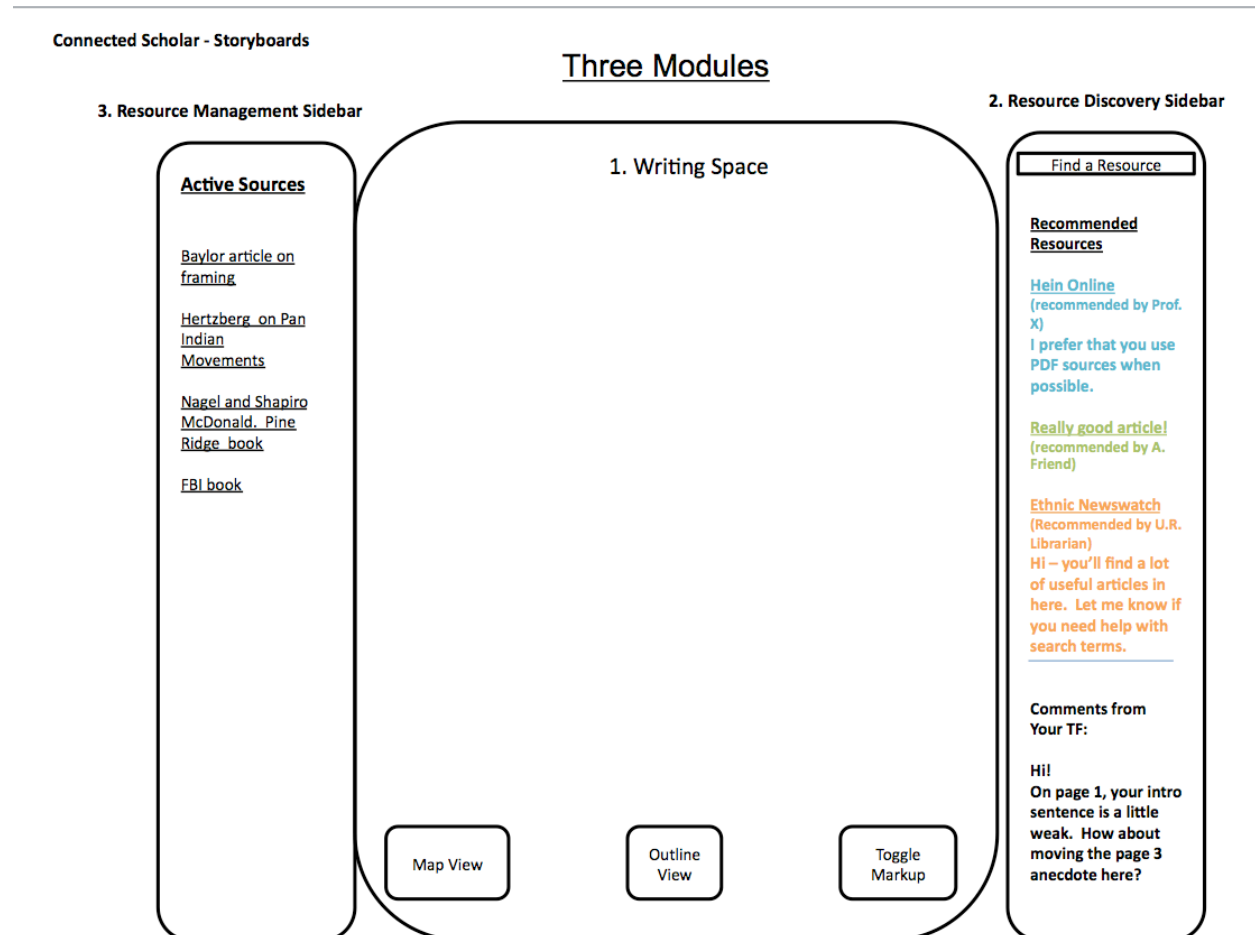
Notes: We believe we have the capacity to manage the project as a whole, as well as administer user studies and focus groups, with contributing 20% of Kimberly Hall's time. We expect to use the Berkman Center developers, which we understand will hold down hourly costs. If the primary development team is amenable, we also contemplate using student developers and/or designers (PITFs) for discrete aspects of the project.

Web developer hours: we consulted with a developer who estimated approximately **90-120** hours of development time for **Phase I**, depending on decisions about the word processing tool, and which identity management system will be used. We believe that subsequent phases, except possibly phase 5, would require less time. We will seek input from other developers to refine this estimate.

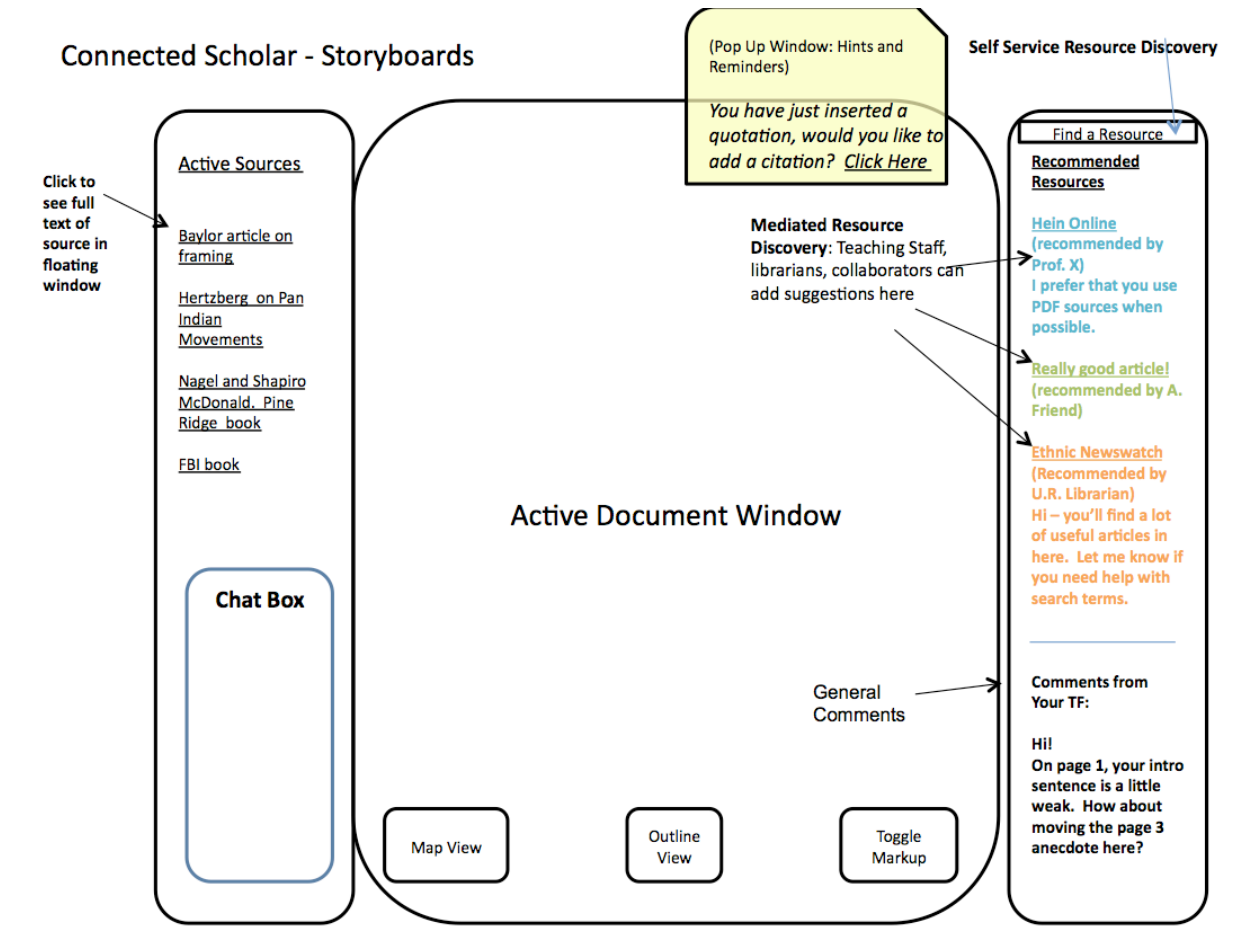
APPENDICES

Appendix A: Storyboards

Slide 1 of 7

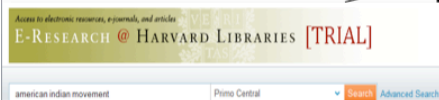


Connected Scholar - Storyboards



Detail: Right Sidebar

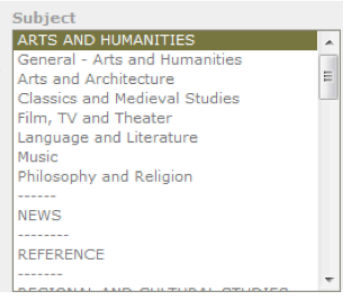
Instead of, or in addition to, subject pull down, a search box for "Primo Central"



Choose your subject area(s) to get instant source recommendations:

Find Resources by Subject

Search Primo Central



Recommendations for You

Hein Online

(Recommended by Prof. X)
You'll find very good materials here.

Really good article!

(Recommended by A. Friend)
I just saw this on the web, and thought it would be great for your paper.

Ethnic Newswatch

(Recommended by U.R. Librarian)
Comment: Ask me if you need help searching this! I think you'll find it very helpful.

Arts & Sciences (JSTOR)

Recommended by: [Harvard E-Resources](#)

Comments from Your TF:

Hi!

On page 1, your intro sentence is a little weak. How about moving the page 3 anecdote here?

Subject classification of e-resources (including research guides) is incorporated, with active links to Harvard e-resources. Links to databases or individual articles can be drag/dropped to sidebar list. Librarians could make subsets of "best" resources, highlight research guides, etc.

Detail: Left Sidebar

The writer can use Zotero-based features to collect sources, and import "libraries" here. Writers can drag and drop the sources they are actively using to the sidebar, and name sources in ways meaningful to the user. Clicking on the link opens up the full text of the article (when available). Writer can cut and paste quotations from articles and a rough citation is automatically inserted into the draft.


Using a program such as Pairwise, active sources are compared in the background against the user's own writing, and prompts to cite will pop up when there is a strong match. When item is available in ShelfLife, the ShelfLife icon appears, and writer can click to discover more, including shelf-rank number, virtual shelf browse, relevant subject headings, etc.

Active Sources

[Baylor article on framing](#)

[Hertzberg on Pan Indian Movements](#)

[Nagel - Renewal](#)

[McDonald, Pine Ridge book](#) 

[FBI book](#)

Toggle to Full
Source Library

AMERICAN INDIAN ETHNIC RENEWAL: POLITICS AND THE RESURGENCE OF IDENTITY*

Joane Nagel
University of Kansas

Ethnic renewal is the reconstruction of one's ethnic identity by reclaiming a discarded identity, replacing or amending an identity in an existing ethnic identity repertoire, or filling a personal ethnic void. Between 1960 and 1990, the number of Americans reporting an American Indian race in the U.S. Census more than tripled. This increase cannot be accounted for by simple population growth (increased births, decreased deaths, immigration), or by changing enumeration definitions or techniques. Researchers have concluded that much of this growth in the American Indian population results from "ethnic switching," where individuals who previously identified themselves as "non-Indian" changed their race to "Indian" in a later census. The question posed here is: Why does such ethnic switching occur? Drawing on historical analyses and interview data, I argue that this growth in the American Indian population is one instance of ethnic renewal. I identify three factors promoting individual ethnic renewal: (1) federal Indian policy, (2) American ethnic politics, and (3) American Indian political activism. These three political factors raised American Indian ethnic consciousness and encouraged individuals to claim or reclaim their Native American ancestry, contributing to the observed Indian census population increase. American Indian ethnic renewal contributes to our general understanding of how ethnicity is socially constructed.

This paper examines the phenomenon of ethnic identity change and the role of politics in prompting the reconstruction of individual ethnicity. Specifically, I examine recent demographic trends in the American Indian population to understand the conditions and factors that lead individuals to

change their racial identity.¹ Between 1960 and 1990, the number of Americans reporting American Indian as their race in the U.S. Census more than tripled, growing from 523,591 to 1,878,285. This increase cannot be accounted for by the usual explanations of population growth (e.g., increased births, decreased deaths). Researchers have concluded that much of this population growth

*Address all correspondence to Joane Nagel, Department of Sociology, 716 Fraser Hall, University of Kansas, Lawrence, KS 66045 (Internet: NAGEL@FALCON.CC.UKANS.EDU). This research was supported in part by the National Science Foundation (grant SES-8108314) and by a 1994/95 Jensen Lectureship sponsored by Duke University and the American Sociological Association. My thanks to Karl Eschbach and Leif Jensen for their generous technical assistance with this and related work, and to Duane Champagne, Steven Corns, Karl Eschbach, John W. Meyer, C. Matthew Stapp, Norman Yezman, Carol A. B. Warren for their helpful comments on this and earlier drafts. [The reviewers acknowledged by the author include Gary D. Sandefur and Charles Tilly. — Ed.]


¹ Consistent with the usage of native and non-native scholars, I use the terms "American Indian," "Indian," "Native American" and "native" interchangeably to refer to the descendants of the aboriginal inhabitants of North America. I also use the terms "race" and "ethnicity" somewhat interchangeably, although I view ethnicity as the broader concept subsuming race, which generally refers to visible (often skin color) distinctions among populations. Ethnicity can refer not only to somatic or physical differences, but also to differences in language, religion, or culture. I acknowledge the importance, some would say pre-eminence, of race in historical and contemporary American ethnic relations.

ShelfLife

Community Relevance

Lesser Greater

Facets
This is where the faceted browsing across all of Hollis will occur.

Trapping is My Life 

America is Indian Country

Native American Power in the United States, 1783-1795
Celia Barnes

The Road Russel Lawrence Barsh

Beyond Red Power

A Bibliography of the Constitutions and Laws of the American India
Lester Harpsett

The Third Space of Sovereignty Kevin Bruyneel

Native Activism in Cold War America Daniel M Cobb

Forced Federalism Jeff Corttassel

The National Congress of American Indians Thomas W. Cowger

The Nations Within Vine Deloria


Documents of Native American Political Development

Government to Government

Government to Government

Red Pedagogy Sandy Grande


Exemplar of Liberty Donald A. Grinde

Indigenous Peoples and the Modern State 

Keyword(s) anywhere

0 [-- explore ShelfRank](#)

Beyond red power : American Indian politics and activism since 1900
[Cobb, Daniel M.](#) | [Fowler, Loretta, 1944-](#)
Santa Fe, N.M. : School for Advanced Research, 2007.

FIND IN HOLLIS Availability 

Infinite Bookshelf

Call number neighborhood

Subjects

Indians of North America Politics and government

Indians of North America Civil rights

Indian activists United States

Political participation United States

Social movements United States


Self-determination, National United States

Neighborhoods


People who viewed this also viewed these

Your recently viewed items

Tag it:

Table of Contents 

Witness to change : fifty years of Indian activism and tribal politics / Donald L. Fixico ...

Add to 'Read this too' 

Detail: Active Document Section – Editing Mode (w/ track changes)

The American Indian Movement

Introduction

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FBI Role

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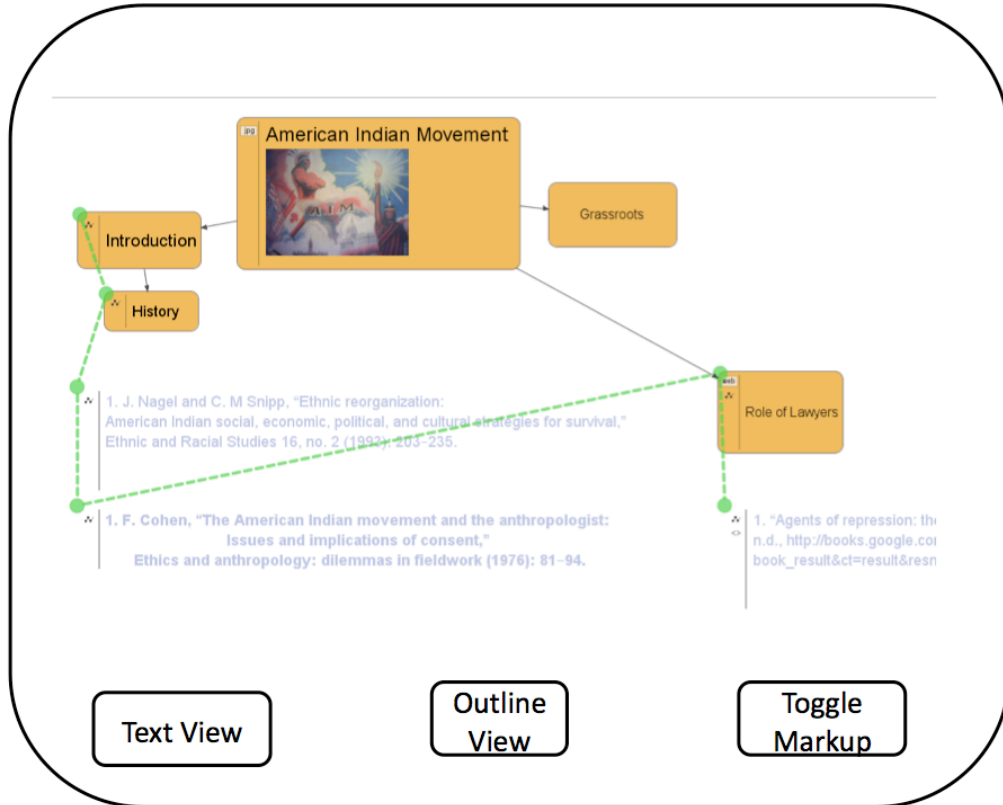
There's a new article on the FBI's role on SSRN

Map View

Outline View

Toggle Markup

Detail: Active Document Section, Map View



The American Indian Movement: Catchy Subtitle

I.Introduction

1.History

a)FBI Role

II.Role of Lawyers

III.Grassroots Movement

IV.Analysis

Map View

Full Text
View

Toggle
Markup

Appendix B: Key Features

User-controlled access to the workspace allowing collaboration and advising

A full-functioned **word processing space** including:

- ability for instructors, collaborators, as well as preceptors, librarians and other academic support services staff to **view a student's writing process** and **insert comments/feedback**
- ability to include **links and multimedia content**

A **resource discovery sidebar** offering:

- **self-service** resource discovery (via Presto Tools and other existing assets)
- **mediated** resource discovery (recommendations from librarians, instructors, collaborators)
- **automated** resource discovery (algorithm offering sets of resources based on user characteristics)

A **resource management sidebar** in which writers:

- can create from their collected sources a **subset of documents** actively being used in their writing
- can **display full text of active resources** in a floating window
- **can copy and paste text with an automatically generated rough citation** directly from the source documents into the composition

Academic integrity features, including:

- background comparison of source document text against student composition, **generating prompts for citation**
- contextual pop-up snippets from plagiarism and **citation guidance** tutorials

Appendix C: Technical resources, sustainability and scalability

The technical resources for this project consist in large part of existing open-source products that we aim to integrate to create this online research and writing space. These resources are large in scale and are also reasonably long-lived, providing a solid foundation for a new product. Where existing code cannot be easily integrated, it can at serve as a model for any new development work that is necessary. The project design and development process can follow five phases. For best results, we recommend a usability study, and/or focus group comprised of a sample of potential users after each phase.

Development Phases

Phase One will establish the pilot design (see appended storyboards) and build the resource discovery and collection functionality. This phase will integrate e-resources discovery and access with a writing space we expect would use either [Zoho \(open API\)](#) or the open source [CKEditor](#) as a word processor. In the resource discovery sidebar, users such as librarians, faculty and TFs can add annotated links. Ideally each contributor will be identified with a unique avatar (such as a profile picture). Resource discovery functions will include access to Harvard eResources via a [subject-oriented pull down directory](#) or [PrestoTools](#), and via a Google-like interface such as [Primo Central](#) (currently in trial). Users can identify links, both to databases and individual sources (e.g. articles), for inclusion in the active project. We hope to include automatically generated resource recommendations based on an algorithm incorporating student data, existing research guide data, and data from [LibraryCloud/ShelfLife](#). If this is not feasible in Phase One, we will include in a later phase.

This functionality will be contained in a sidebar to the right of the writing space. In addition, this sidebar will provide space for collaborator whom the writer allows to access the workspace to add recommended links with comments. *Usability study following Phase One.*

Phase Two will develop the resources organization features, allowing the writer to manipulate collected sources (through drag n drop using Zotero-like code) in the left sidebar. Also, open-source applications that recognize copied text and can alert the writer to insert a citation exist (such as PairWise or WCopyFind). We plan to integrate this feature in Phase Two as well. *Usability study following Phase Two.*

Phase Three involves expanding beyond the linear view and into a conceptual map view for brainstorming, outlining and building one's work. Tufts University has an open-source concept-map application called VUE. We can build on this code, which is already integrated with Zotero citation code. *Usability study following Phase Three.*

Phase Four involves integrating the Connected Scholar to feed data back to Shelf Life/Library Cloud. *Usability study following Phase Four.*

Phase Five involves final analysis of the interface and a space to make changes, both those at the surface level and deeper changes necessary for the product to be embraced by the Harvard University Community. *Usability studies.*

PHASE 1	Build writing space to which author can invite participants (inc. prof, librarian, etc.) (prof could set requirements), w/ sidebar for easy discovery and use of e-resources, and ability to drag and drop links w/ comments into sidebar
Text editor, possibly based on CKEditor (opensource) or using Zoho API Harvard e-resources, PrestoTools, PrimoCentral, sfx	1) collaborative word processing 2) track changes mode that distinguishes between commenters by color (as in MS Word) 3) accepts drag and drop insertions from sidebar 4) accepts inline annotations on sidebar 5) import/export MS Word docs Ideally, would allow an avatar to be associated with each commenter 6) i-frame type access to e-resource tools in sidebar
Phase 2	Adds left sidebar in which sources can be imported/drag/dropped from Zotero libraries, and zotero features can be used to produce formatted citations and bibliographies. Drag and drop from full text of doc w/ automatic rough citation (copy w/ cite) added to paper
Zotero (open source)	1) collect resources on web 2) enable drag and drop from zotero into "current source" list sidebar, 3) allow user tagging of resource, 4) apply format rules for major citation formats 5) automatically insert formatted references when source is quoted (using drag and drop insertion), or at other points
Mozilla OpenAttribute (open source)	copy w/citation functionality for Creative Commons licensed items on web - plug in for FF, Chrome, Opera.
TextCite (open source)?	copy with citation functionality for nonCC sources,
Phase 3	Adds conceptual mapping mode, and outline mode for viewing document. Adds alerts when citations are needed, based on background document comparison.
VUE and VUE/Zotero plug-in (OpenSource)	Concept mapping features, drag and drop Zotero citations to map, ideally creates outline from map and vice versa
PairWise (open source) http://www.pairwise.cits.ucsb.edu/	compares documents to identify potential plagiarism risks. Ideally would generate a pop-up warning to the writer prompting to cite
Phase 4	Incorporates ShelfLife features, including "shelfrank" indicator, people who viewed also viewed..., clickable subject headings, etc.
ShelfLife, LibraryCloud	Incorporates SL for discovering related/connected resources, querying author information, showing interest in work ("ShelfRank"). Ultimately, aim to feed back data (w/ user permissions) to supplement SL/LC analytics
H2O Playlist (Berkman/opensource)	tracks provenance of sources, shows connections, generates data for shelflife feedback
Phase 5	User studies, refining interface, etc.

Comparables

When we first express this idea to our colleagues many point out that the functions of Connected Scholar are similar to Zotero, Google Docs or Mendeley.

It is the *combination* of the benefits of word processing tools, citation management tools, a course E-resources guide and Shelf Life that provides Harvard students and academic scholars a unique and productive place to build their ideas, compile their resources where the resources are and to draft their work within a space where they can connect with teachers, librarians, peers and colleagues.

Connected Scholar integrates the functionality of a citation tool such as EndNote, RefWorks or Zotero, the collaborative and simple interface features of GoogleDocs, and the open source word processing tool of CKEditor. It does this with a pedagogical and scholarly focus on building ideas through an interactive writing process, while also facilitating discovery of and access to Harvard's vast e-resources.

Probably the closest product currently available to what we envision is Mendeley. However, there are important differences. First, unlike Connected Scholar, Mendeley does not provide a integrated writing space within the tool. This reflects Mendeley's focus on collecting, annotating and sharing documents, as opposed to a focus on ideas and the writing process.

In addition, Mendeley is not open source and is a for-profit enterprise. This is important because it gives a for-profit company control of the data generated by the participating scholars. We recognize the potential value of Harvard-specific user data, and we believe it is important to maintain control of this data, and to make it available to our own ShelfLife/LibraryCloud project.

Mendeley also differs from the Connected Scholar in that it is not designed as a teaching tool. Thus, it is not intended to be a window for instructors, writing professionals and librarians into the work of their students, nor is it designed to provide assistance or guidance in writing or citing works.

Mendeley also has a fairly complex interface, which we hope to simplify. To provide additional context for our proposal, below is a table of representative products that offer some of the same characteristics as Connected Scholar. The list is not meant to be exhaustive, but rather to distinguish some other popular tools from the product we envision.

Product	Organization tool	Bib management	Collaborative	Discovery tools	Open Source	Other
Mendeley	X	X	X But not designed for instructors and librarians to monitor and give	X	N (for profit, although currently free)	Primarily used by scientists, may not sync with Zotero, social

			feedback on students ongoing work			networking features available
Google Docs	X		X		AXI	
Noodle Tools	X	X	X	?	Fee- based	
Zotero	X	X	X		X	Does not include a writing space
<i>Connected Scholar</i>	X	X	X	X	X	