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# Building Library Web Apps

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**ABSTRACT** Previous conferences have included workshops encouraging librarians to learn computer programming skills in order to develop efficient software solutions for problems they face in their work. This poster presentation highlighted two web apps developed by Covenant's library staff: a reference e-book meta-search engine and an interactive ILL request form supporting inbound OpenURL linking. The poster described motivations for developing these apps, reviewed the technology used and the development process, summarized the impact on library service, and identified directions for future development.

## E-REFERENCE METASEARCH

### Background & Challenges

The Covenant Library had acquired a small collection of online reference titles on the Gale Virtual Reference Library platform. Wanting to grow the availability of online reference content for our patrons, particularly in areas not as well served by Gale, we also added content on the Credo Reference platform (and still later added content from Oxford Reference and De Gruyter). However, by moving to having content distributed across multiple online reference platforms, there was no longer a single search interface for that content. If a patron was interested in a specific title, they could locate that through the library catalog, but there was no single place to search within all available online reference content.

We wanted to provide our patrons with a single search interface that would surface relevant online reference material across all our online reference platforms.

### Design & Implementation

**MODULAR STRUCTURE** Each platform provides its own unique API or interface for searching, so the search results are not provided in any consistent format. Therefore, we needed a modular design that

## SEARCH ONLINE REFERENCE BOOKS

inner-biblical interpretation

+ Search

## TOP RESULTS FROM CREDO REFERENCE

**INTERTEXTUALITY AND INNERBIBLICAL INTERPRETATION** — *The IVP Bible Dictionary Series: Dictionary of the Old Testament: Prophets*

biblical text be. cause its meaning is shaped by the wider canon of Scripture. Both as classically defined and presently practiced (especially in the field of biblical studies),...

**RUTH 3: HISTORY OF INTERPRETATION** — *The IVP Bible Dictionary Series: Dictionary of the Old Testament: Wisdom, Poetry, Writings*

biblical account by his omission of most instances of direct speech and references to God. ... Occasionally, Torah is expounded by the creation of expanded conversations that move from the biblical...

**Intertextuality** — *Dictionary for Theological Interpretation of the Bible*

biblical interpretation (Phillips 244), and interrelation with other texts need not rule out authorial intention...

**Dictionaries and Encyclopedias** — *Dictionary for Theological Interpretation of the Bible*

Biblical Interpretation (Coggins and Houlden) provides essays sketching the history of interpretation of biblical books and discussing major biblical interpreters (e.g., Origen and Augustine), interpretative...

**Inner-Biblical Interpretation** — *Dictionary for Theological Interpretation of the Bible*

See Intertextuality

[See more from Credo Reference.](#)

## TOP RESULTS FROM GALE VIRTUAL REFERENCE LIBRARY

**Sarna, Nahum M.** — *Encyclopaedia Judaica*

SARNA, NAHUM M. (1923–2006), biblical scholar. Sarna was born in London into a family that was both traditionally observant and Zionist. After receiving an intensive elementary and secondary Jewish education, he attended...

[See more from Gale Virtual Reference Library.](#)

## TOP RESULTS FROM DE GRUYTER

**Interpretation, History of** — *Encyclopedia of the Bible Online*

**Commentaries (Genre)** — *Encyclopedia of the Bible Online*

**Higher Criticism: Judaism** — *Encyclopedia of the Bible Online*

[See more from De Gruyter.](#)

## TOP RESULTS FROM OXFORD REFERENCE

**Inner-biblical Interpretation** — *The Oxford Encyclopedia of Biblical Interpretation*

... Biblical interpretation in Ancient Israel . Fishbane did not discover inner-biblical interpretation, but his watershed work marks a first attempt at a comprehensive portrait of inner-biblical interpretation and puts its study on a methodological footing. (Kugel, in his criticism of Fishbane's work, briefly describes how questions of inner-biblical interpretation arose before Fishbane). The sheer scope and detail of Fishbane's work accelerated scholarly interest in the phenomenon of inner-biblical interpretation. At the same time, central aspects of Biblical...

**Theological Interpretation** — *The Oxford Encyclopedia of Biblical Interpretation*

...Interpretation ; Canonical Criticism ; Cultural-Historical Criticism ; Diachronic Interpretation ; Evangelical Interpretation ; Exegesis ; Historical Criticism, subentry Hebrew Bible ; Historical Criticism, subentry New Testament ; Homiletics ; Inner-biblical Interpretation ; Liberation Hermeneutics ; Literary Criticism, Literary Theory, and the Bible ; Narrative Criticism and Narrative Hermeneutics ; Pentecostal Interpretation ; Postmodern Interpretation ; Reception Criticism and Theory ; Rhetorical Criticism ;

<https://www.covenantlibrary.org/reference-search/?q=inner-biblical+interpretation>

would allow us to drop in a custom connector script for each platform that would pass the user query to the appropriate endpoint, parse the response data according to the platform's chosen format (XML, HTML, JSON, etc.), and return the data to our app in a standardized format and structure.

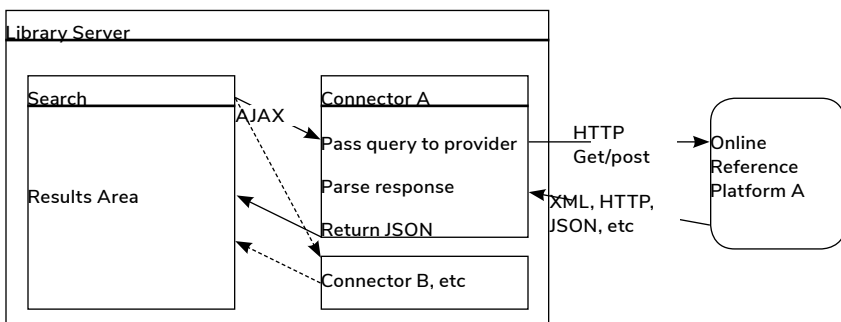
**ASYNCHRONOUS** Response times for each platform vary, so rather than waiting for all responses to arrive before displaying results to the user, we run the searches of each platform asynchronously and dynamically update the search page as results come in.

**RANKING VS. GROUPING** Results from each platform are returned in relevancy ranked order, but on what basis could we compare them against results from other platforms in order to interfile them? Would we even want to dynamically interfile results, as that would often cause items to move as the user was beginning to examine them? Implementing our own relevancy ranking algorithm seemed to be a more complicated task than we wanted to take on, so we instead grouped results by platform, displaying just the top five from each platform (in the order provided by the platform) followed by a link to continue searching on that platform.

**TECHNOLOGY** When the user executes a search, our JavaScript web app uses the jQuery library to asynchronously call each of our connector modules. The connector modules, written in PHP, query the reference provider's search API or interface; parse the response for the top five results, selecting the data we want to display to the user; and return that data to the app in JSON format. Our app processes the JSON from each connector as it arrives and dynamically adds the results to the page.

### Impact

Our Online Reference Search tool met our objective of creating a one-stop search for all our online reference content. As we've grown from having two e-reference providers to four, the modular system design



accommodated the new data sources easily. The hardest part was coding the new connector modules to communicate with the new platforms.

### **Future Development**

As we add new platforms, we may have to reduce the number of results displayed from each platform, or rethink how we group and/or rank results, in order to ensure that content from all platforms is given sufficient prominence.

## **ILL REQUEST FORM**

### **Background**

Covenant Seminary offers patron-initiated interlibrary loan service. Since the library does not have a patron-facing ILL system, the staff had configured the basic ILL request form function supplied by each of our major database platforms, where available. The library staff had also worked with the institution's IT department to offer a basic web form for submitting ILL requests for items discovered in other contexts. Requests submitted through these systems produced an email with the submitted information to the library's designated ILL contact.

### **Challenges**

**IDENTITY** The ILL request systems built into the database platforms could generate requests based on the information on the record from which the patron initiated the request; however, the patron still had to enter his or her own identity and contact information for each request. The vendors provided few customization options, which meant that much of the information required by these forms was unnecessary for our needs or redundant with patron information already on file, and the information required by each vendor was different.

We wanted a unified patron experience that minimized the need for patrons to repeatedly enter personal information that was unnecessary or already available to the library staff.

**UNCLEAR PATRON WORKFLOW** The inclusion of the ILL request link on the search results screen of our databases allowed patrons to initiate ILL without first using the library's OpenURL link resolver service to check for availability in other library resources, so requests could be made for content already accessible to the patron.

We wanted the patron to initiate the ILL request from the OpenURL resolver screen, creating a standard sequence of actions for our patrons, and for the OpenURL resolver to pass the item data into the ILL request form for accuracy.

**STAFF WORKFLOW** ILL requests were coming from multiple interfaces, with each providing data in a slightly different format. Adjusting to inconsistencies from one request to the next made transferring the data into the OCLC ILL system less efficient.

We wanted the data in the ILL request notification email to be presented in a predictable format, and in a way that made it easy for staff to copy and paste into OCLC resource sharing.

The screenshot shows a web form titled "Interlibrary Loan Request" for Covenant Theological Seminary. The form is divided into several sections: "YOUR REQUEST" with a dropdown menu for item type (currently "an article from a periodical"), a section for article details (Author, Article Title, Pages), a section for periodical details (Periodical Title, Date, ISSN, Volume #, Issue #), and a section for delivery method (currently "Email"). There is also a "NOTICE: WARNING CONCERNING COPYRIGHT RESTRICTIONS" section with legal text. At the bottom, there are two buttons: "+ I agree, submit this request" and "+ Reset form".

<https://www.covenantlibrary.org/ill/>

### Design & Implementation

**PATRON DATA API INTEGRATION** We used the API for accessing patron data provided by our ILS to create a login mechanism that allows us to automatically verify eligibility for ILL service, to include the necessary patron information in the notification to the ILL staff, and to offer online students the option of requesting copies of articles from our print periodicals.

**OPENURL SUPPORT** In order to ensure accuracy, and for the convenience of the patron, it was vital that we be able to pass information about the desired item from our OpenURL link resolver into the ILL request form. Therefore, we programmed our form to parse OpenURL encoded information and to use that data to pre-fill the request form.

**OPTIMIZED EMAIL TO STAFF** The email sent to the ILL staff notifying them of a new request was designed so that the information is presented in an order that is sensible to their workflow and formatted so that it is easy to select and copy.

Interlibrary Loan Request: Article			
Name	[REDACTED]		
Barcode	[REDACTED]	Degree	[REDACTED]
Email	[REDACTED]		
Delivery	Email	Campus	St. Louis
Author	Mayfield, Tyler D		
Article Title	The accounts of Deborah (Judges 4-5) in recent research		
Periodical Title	Currents in Biblical Research		
Date	20090601	ISSN	1476993X
Volume #	7	Issue #	3
Pages	306-335		
Data Source	EBSCO:ATLA Religion Database with ATLASerials		

System-generated email from covenantlibrary.org

**RESPONSIVE WEB DESIGN** With mobile device usage increasing, we made sure that the ILL request form looked and worked great on small and large screens alike.

**TECHNOLOGY** The request form is implemented in PHP for managing the login session, parsing OpenURL data into the form, performing data validation after submission, and sending the staff a notification email. The form also makes use of JavaScript and the jQuery library to customize the form fields and options offered based on the requested material type.

**IMPACT** We configured our OpenURL link resolver to display the new OpenURL-enabled ILL request form as a fulfillment option, and we removed the ILL request links from all of our databases. That created a clean, guided workflow for our patrons as they sought to access materials discovered in their searches.

The clean, unified, optimized staff notification emails enhanced staff workflows.

**FUTURE DEVELOPMENT** The ILL request form currently supports the original OpenURL 0.1 standard, which is still in wide use. For future compatibility, we will need to add support for the OpenURL 1.0 standard.