



## Macquarie University Research Online

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# Growing a Library Portal from Vision to Reality

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## Abstract

The topic of library portals has generated many metaphors, but few concrete examples the vision for search portals is one that entices. We know what we want to do; provide users with streamlined access to multiple resources and create a user centered customizable electronic presence that enables them to fully utilize the resources available to them. At Macquarie University Library we have realized, using Fretwell Downing's ZPortal software, an academic library search portal. During the process of that realization we were able to identify gaps between the enticing vision and the practical realities of implementing and maintaining such a search portal.

This paper will explore these gaps in the context of the common vision held for library search portals and Macquarie University Library's experience focusing on the challenges we encountered during the process of creating a user-centered search portal. As an early adopter of this search portal approach our goal is to share the lessons we learnt in order to facilitate the development of future academic library portals.

## Introduction

Higher education institutions are transforming their websites into portals at a rapid rate. At their best, institutional websites provide a cohesive and easy access to a wide range of university resources and services that users must access to perform effectively in their varied roles. Portals can improve this access through customized views based on user needs and by integrating the functionality of multiple back-end systems. In the development of university portals, some institutions are benefiting from an array of technologies and methods that have been developed for and refined in commercial enterprises. Nevertheless, the implementation of a university portal is a massive undertaking that involves great complexity and affects changes on processes and systems.

Similarly, to successfully create a university library portal requires a huge commitment of resources. This paper will outline the common vision for library portals; explain Macquarie University Library's experience in attempting to achieve this vision; describe and assess the gaps between the vision and the reality of implementing a portal; and finally, offer an interim strategy for moving towards improved online access to library resources when a portal is deemed too risky.

## Why a Portal in an Academic Library?

Library users confront an increasingly complex information environment. Scholarly and course-related materials are gathered from large print collections, online journals, and various research databases. In response to the pace of change and the challenges of new formats, many libraries have developed a range of ad-hoc finding tools. At the time of

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our portal project, the typical Macquarie student needed to use all of the following finding tools simply to locate, but not necessarily retrieve, information:

- Library catalogue for print and other physical materials
- Searchable database of databases to find and connect to research databases
- Searchable database of online journals to locate and connect to commercial journal collections

The multiplicity of formats and access methods presents a tedious workflow for the experienced researcher. For inexperienced users, the problems can be insurmountable, leading them to rely on less authoritative sources of information available on the Internet. To illustrate the burden on users, consider a workflow for an undergraduate psychology student conducting research for an essay. This workflow is somewhat idealized as it assumes the student understands the proper use for each of the finding tools.

1. Search Library catalogue for books and/or print reference material.
2. Consult a bibliographic database to search the journal literature.  
At this point, the student must choose from among over 200 research databases, which she is unlikely to do effectively without prior knowledge or the assistance of a librarian. For this example, we shall assume her lecturer has recommended the database PsycInfo.
3. Connect to PsycInfo and search on topic. Once the search is conducted the results will include a few references that link directly to full-text but most will not. There will be no indication of whether the Library holds the articles that are not linked either online or in print.
4. Print out a list of promising references.
5. Search the database of online journals to determine whether Library holds the journal.
6. When available, connect to online journal and browse or search for desired article.

Steps 5 and 6 must be repeated numerous times and in many cases the desired article will not be available, which leads to feelings of wasted effort and frustration for the user. Moreover, the users are unlikely to feel confident they have performed the complex process correctly, which can add anxiety to the mix of negative feelings. At this stage, the user has only consulted one database. To consult another database, the user must repeat the entire process, including coping with yet another search interface.

This workflow points to three difficulties for library users:

- There are too many places to search.
- It is difficult to know where to begin.
- There are too many obstacles between document discovery and document retrieval.

Our customers are asking for simplified access, search and retrieval of resources:

“The ability to search multiple databases, ie Georef, Geobase, Current Contents, etc from one site all at the same time, without having to search each one independently would be great and save lots of time. Any hits you get should also tell you if the item is held at Macquarie or not and its call number...”

(Student’s e-mail feedback gathered during preparation for the new portal interface)

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In the development of library portals, libraries are also seeking to maintain their authority and influence in academia. In its white paper on the *Scholar's Portal* project, the ARL has argued that libraries are losing ground as information mediators in the web environment to our own detriment and that of scholars as well. They argue that academic rather than commercial biases should influence the development of search and discovery tools in the scholarly community. In their view, an effective portal will allow the academic library to reassert itself in the online world by virtue of the superior content and enhanced services it is best positioned to provide. (Campbell 2001)

### **Key Features of the Vision**

A portal in an academic library setting can potentially serve a number of essential functions and provide a range of compelling functionality for users and libraries. In Neil McLean's closing address at the Information Online conference 2001 he described the library portal as

...a euphemism for a number of activities which include: to harness resources through description and identification; to make them more recoverable; to make them more useable; to provide customization and personalization (two different but related features); to integrate into the business of the organization; to provide a basis for e-commerce; and to provide "digital convenience"  
(McLean 2001)

Thus the library portal can function as a one-stop-shop of information resources, where citation databases, online journals, the library catalogue, and websites can be queried using a single search box. Linking from the document reference to the full-text document should be seamless and transparent to the user. Finally, the portal should only display resources that are appropriate for and accessible by the customer. It should put to rest the irksome question, "why should I go to the library when everything I need is on the Internet – and is much easier to find?"

Key features of a library portal include:

#### *Super Search Box*

To match the convenience of the web with the authority of the library, the portal offers a single search box, which drills into commercial databases, library catalogues, locally digitized collections and web resources. This is accomplished through a combination of search methods including z39.50, HTTP-based web scrapers that emulate human searchers or XML, depending on the requirements of the external database. This approach can be described as horizontal integration. It eliminates the need for the user to determine which resources to search or to conduct the same search in multiple interfaces or places. A super search box can provide uniform information architecture and streamline access for novice users with a consistent interface so that each search is conducted in the same manner. At its most effective, this is the library portal's answer to Google. It is also the key thing that distinguishes a portal from a website.

#### *Seamless Document Retrieval*

It is common for researchers to discover a journal article in a citation database but the full-text of the article will reside in a separate database. Most portal products offer an implementation of the Open URL standard as an integrated or add-on product, allowing for the vertical integration of research process from document discovery to retrieval. The result, from a user point of view, is a button that can be clicked from within a reference and will

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automatically retrieve the desired document wherever it resides. The future potential for this functionality to be integrated with document delivery is promising.

#### *Usable, Cohesive Interface*

While the ability to search resources from a single search box is critical, it is also important to present users a view of resources that is comprehensive and usable, empowering them to make their own decisions about their own best research tools. Advanced users require the means to access native databases directly in order to exploit their more sophisticated features. Most portals allow librarians to set up hierarchical collections of resources, with associated metadata and annotations. This draws on librarians traditional competencies in subject arrangement and their knowledge of the structure of academic programs and research interests in their universities.

#### *Customization and Personalization*

Customization features allow the librarians to “push” the most appropriate resources to pre-defined groups of users. For example, biology students could be given a default search profile including science-oriented databases. Users could be made aware of the only services and resources they are entitled to use. Personalization features allow users to create their own sets of favorite resources and save canned searches.

#### *Access Control*

Access control functionality includes user authentication and the ability to authorize user access to resources at a granular level. These functions should be integrated with university-wide authentication systems and database access systems such as proxy servers.

### **Macquarie University's Experience**

At Macquarie we thought that the vision for portals had evolved into a well defined set of features that addressed critical library challenges. We investigated the market for portals and found that several viable, if untested, products were available. Though we recognized the project would involve some uncertainty and risk, we felt that forging ahead with rapid development would be the best way to reveal the capabilities of current library portal technology.

After reviewing several products, we determined that Fretwell Downing's ZPortal would best meet our needs. Two factors weighed heavily in our choice. Macquarie had been working with Fretwell Downing on the ongoing LIDDAS document supply project, which shares common underlying software with ZPortal. The potential to integrate portal search and discovery functions with document supply was enormously attractive. The second factor weighing in favor of ZPortal was its flexible z2Web technology. As mentioned earlier, the task of cross searching z39.50-compliant databases is relatively simple. A key priority for us was an effective solution for cross-searching the many web-based services that do not support z39.50. z2Web's are customized for each database and emulate a user at keyboard. After conducting the search, the z2Web “scrapes” the result set from the screen and manipulates the data so that it can be handled by a z39.50 client and then presented in a variety of formats including MARC records. At the time of our evaluation, we found that z2Web was already a mature technology and highly effective in practice. Several z2Web's had already been developed for popular databases and Fretwell Downing was willing to develop customized z2Web's to our specifications.

The implementation of ZPortal took place between April and July 2002. And followed a similar path to that described by Monash University Library. (Groenewegen 2003) To summarize, the project involved:

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- Acquisition and installation of four web servers running Apache Tomcat and a high-end Sun server also running Oracle
- Installation of the underlying portal software, VDX, and ZPortal by Fretwell Downing
- Prioritization of databases for configuration by reference librarians
- Development of a Library “people server” to create a comprehensive set of authentication data in a central store
- Creation of metadata about electronic resources and arrangement of resources into search profiles and a hierarchical collections tree
- Configuration of over 20 targets including electronic journal collections, research databases and vetted web gateways such as bizEd, OMNI and SOSIG, which offer z39.50 support
- Extensive in-house customization of the web interface to ZPortal

This project drew the Library into a more collaborative relationship with University IT Services. The technical requirements of portal implementation and maintenance outstripped the skills, resources and infrastructure of the library. The project benefited significantly from this relationship and one of our best decisions was to engage them in our vision from an early stage.

The results of our overall effort were a functioning search and discovery portal, meeting many of the objectives initially set. It provided access to over 200 databases and other online resources such as vetted websites and librarian-authored subject guides. Access to databases was available from 16 subject and format-specific search profiles, in which non-searchable databases could be linked to. Users could also create their own profiles by selecting from a hierarchical tree of collections. The portal also offered a searchable “database of databases” as an alternative route to resource discovery.

While the portal included only 20 searchable targets, these included several large aggregated services and represented an impressive amount and range of content. In fact, we began to question how many searchable targets could profitably be included in a search profile before the results became unmanageable. Immediate feedback from test users was generally positive. The idea of a search portal was immediately understood and viewed as a positive development.

Having come this far, we intended to replace the database access page on our website with ZPortal, which we branded *Databases+*. At the last minute, a genuinely minor technical problem delayed the launch of the system. Given the constraints of the academic year, we decided that we could not change the access to critical resources in the middle of the semester. Additionally, we noted that the pace of change in the Library's systems was beginning to place great strains on staff, our operational processes and established information literacy programs. We did not want to extend this stress to our users unless we could ensure a smooth transition and a sufficiently improved level of service to justify the impact of the changes.

As a result of these concerns, we decided to delay any decision to launch the system and allow time for evaluation and reflection. Relieved of the pressure of a launch date, we have taken the opportunity to assess our implementation against our original goals. We have also begun to question whether portal technology, at its current level of development, will in fact streamline access to electronic resources in a way that benefits users.

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## Assessing the Gap between Vision and Reality

In assessing the shortcomings of our portal project, we do not wish to present either a dismal view of portal development as a strategy or to criticize ZPortal. The technical challenges to be overcome apply to portal technology in general. The authors of this paper believe that the development of an effective search portal remains the best strategy for serving our user community and extracting maximum benefit from the investment in research databases. Our goal is to share our experience as an early adopter so that other projects may benefit from it.

### *The Not Quite Super Search Box*

Considering the technical complexity of searching multiple external databases simultaneously, it is a substantial achievement that it can be done at all. These technologies are promising but implementers of various portal products, including Macquarie, have found successful cross searching difficult to achieve and maintain. (See also Girke 2003). Moreover, many of the features users have come to expect from result sets, such as ranked results and sorting functionality are either lacking or difficult to use.

Configuring database targets for searching is a daunting task and we soon realized that it would not be feasible to configure and maintain each of the 200+ databases we offer. This meant that the super search box would provide access to selected databases and we would need to direct users to the native interfaces of the others. We decided to include non-searchable databases in the subject-specific search profiles as links.

While configuring z39.50 databases is relatively simple, we found that the results generated from some of these databases were unusable. In some cases, key data, for instance journal title, were not returning in the results. In other cases, the remote z39.50 servers were configured to return the oldest records first. The quality of results relied almost entirely on the quality of the z39.50 implementation at the remote database. (Though pressure may be applied, overall interest in the standard is on the decline as alternative technologies, such as XML, gain in popularity and acceptance.) In a few cases, we opted to have customized z2web targets developed for databases with disappointing results from z39.50 searches.

z2web targets emulate human users at the search box of the native database and “scrape” returned results from the screen interface. This method provides greater flexibility as the display of results can be customized. It also extends the portal’s reach to databases that do not offer z39.50 access. Nonetheless, there are three disadvantages: the targets cannot be developed in-house which brings additional costs for development and maintenance; targets take time to develop; and finally, any minor change in the interface of the external database can break the target. Understandably, database vendors do not give advance warning of insignificant changes so there can be a delay between change and adjustment of the target.

While the configuration and maintenance of targets do present challenges, these could be overcome with sufficient resources and determination from the implementing library. A larger, more intractable set of problems is related to the result sets generated from cross searching. Depending on the number of databases searched and the terms entered, the number of results can be overwhelming. This would not be such a problem if the most relevant or significant results were displayed first. This is not the case. The order of results depends on factors unrelated to their usefulness. In ZPortal, the relative speed of the remote databases in returning results determines which are displayed first. The large number of results returned often makes re-sorting the list impractical. Uneven support for Boolean searches by remote databases eliminates the strategy of using more focused searches to reduce the

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number of results.

These difficulties make it unlikely that library portals will rival the convenience and effectiveness of Google. Despite its apparent simplicity, Google uses a sophisticated search algorithm to determine the subject matter, relevance and relative value of documents. For example, a document that is often linked to by other documents is considered more significant than other documents (McGarvey 2000). Ironically this is similar to citation analysis, a methodology developed by information workers to assist the first victims of information overload – academic researchers. Because scholarly literature is rich in references to other documents, adaptation of these techniques for library portals could provide a significant breakthrough in making search results more usable.

We believe that progress on the ranking of results and the user's ability to influence this will be the key factor in determining the future viability of library portals. As Mary Jackson (2002) argues, "Portals must be able to rank search results differently to meet the needs of different users. Users should be given choices in how those results are ranked or listed. Some users, for example, may want only items from one source while others will want to see only a listing by date of publication."

#### *Seamless Document Retrieval*

As with cross searching, the context-sensitive retrieval of documents also requires extensive configuration. In our project, we miscalculated the importance of implementing an OpenURL solution. We opted to devote our limited time and resources to configuring database targets for cross searching. Our strategy was to focus on full-text journal databases and retrieve the links to full-text documents with the results record. This added complexity to our target configurations and also limited the types of databases that could be integrated. In fact, our strategy should have been reversed. If we had implemented context sensitive linking from references to full-text, we could have better exploited citation databases, more of which offer support for z39.50 searching. Additionally, OpenURL functionality can be extended to many commercial databases so those users can benefit from links within native database interfaces. OpenURL implementations offer immediate benefits even without cross searching functionality. They also lend themselves to more phased implementations. For libraries that do implement these products, the challenge is maintaining configuration information for services and journals. In many cases this requires an additional set of journal data to be maintained, in addition to that already held in the library catalogue.

## **Additional Operational and Organizational Challenges**

#### *Ongoing Configuration and Maintenance Requirements*

Configuring and maintaining portal applications requires extensive staff time and the development of new skills. Successful portal implementation probably cannot be managed as an add-on to an existing job position.

#### *A Holistic Approach to Creating the Usable, Cohesive Interface*

Library portal products will not replace the library website. Many of the problems prompting portal projects might be addressed by increased attention to web development and usability issues. The analysis devoted to arranging databases in searchable collections can also be profitably applied to database access pages in traditional websites. Libraries that need to choose between website development and portal development may find a usability approach to website redevelopment less risky and more immediately beneficial for users.

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### *Customization and Personalization*

Portal products offer the functionality for customization, but libraries need adequate details about their users to make use of this. While many libraries can tap into university services, such as LDAP servers, they may not offer the granularity of data required to offer subject and user status tailored views. Understanding the use of personalization features will require research into user behavior, followed by appropriate marketing, monitoring and training.

### *Access Control*

Granular access control can be greatly facilitated by the availability of university solutions such as LDAP servers. Where available, however, these systems often fail to cover all the relevant user groups. For example libraries often serve users, such as associate borrowers or visiting researchers, who may not be registered in larger university systems. At Macquarie, the Library runs its own "people server" that collects data daily from numerous staff and student systems throughout the university.

Another challenge is integrating with existing solutions, such as EZProxy. One option is to allow EZProxy to handle authentication on behalf of the portal. ZPortal can be configured to send all queries via a proxy server. The disadvantage of this approach is that it undermines part of the functionality that portals are supposed to offer: the flexibility of limiting database access rights to particular user groups. While this is not currently relevant at Macquarie, the ability to purchase subscriptions for subsets of the user community could be a longer-term strategy for managing the overall cost of online products.

### *Proliferating One-Stop-Shops*

There are now four one stop-shops either in development or in use at Macquarie University; a student portal, a generic skills portal, a help one-stop-shop and the Library search portal. Unless these 'portals' integrate in a meaningful way they may become counterproductive.

## **What's a Library to do?**

At least in the short-term, implementing a library portal is likely to be a high risk undertaking. As more libraries report the results of their endeavors, other libraries will benefit from lessons learnt and will have a better understanding of the risks and issues at the deliberation and planning stage. At Macquarie, we are now considering every option ranging from forging ahead with ZPortal, joining consortium efforts or simply waiting for a few years until product functionality has been improved and expanded.

In the meantime, we have adopted several strategies which are bringing immediate improvements to electronic access for our users, while putting us in a better position to exploit portal technologies in the future. We are knowledgeable about what is required to develop and maintain a portal, and this has affected our approach to the management of bibliographic tools, staff resources for electronic services, database evaluation, website development and other operational processes.

For libraries that decide not to pursue portal development at this time, a few smaller projects will offer immediate benefits and provide a foundation for any future portal projects:

#### *Website Evaluation and Development*

Evaluating the usability and navigational structure of the library website with users can lead to achievable short-term redevelopment projects. On the advice of our users, we have grouped our finding tools and research advisory services together under the banner, "Research Central." These resources and services are precisely the ones that we wanted to integrate so this decision has laid the groundwork for the future transition to a portal environment.

#### *Electronic Journals Data Management*

Until recently, the Library manually maintained a searchable database of journal titles with links to the front pages of the relevant electronic services. Though popular, the tool was inadequate and often out-of-date. To rectify this the Library devoted significant resources to ensuring all data resided in our newly implemented Voyager catalogue, including direct links to journal titles rather than services. This has been facilitated by setting up automated data loads for large services. Because our old tool was extremely popular we still offer it though it queries data extracted from Voyager into an Oracle database. The positive response from users has been exceptional. Moreover we foresee that our higher quality data and ability to extract this to other systems will assist in the possible adoption of an OpenURL solution.

#### *Database Management*

Many subscription databases offer integration tools that can be used in conjunction with library catalogues and OpenURL solutions to facilitate context-sensitive linking. We also favor subscribing to multiple databases on a single platform.

#### *People Data*

As explained above, the customization and access control features of portals cannot be implemented without adequate user data. Libraries would benefit from a general analysis of the types of data required to construct, genuinely customized views of electronic resources and services. Once the gaps between required and readily available data are determined a library is in a better position to contribute to the development of university wide authentication and authorization systems, as well as building its own for use across multiple systems.

### **Conclusion**

Macquarie University Library envisioned a portal, and in conjunction with Fretwell Downing, attempted to bring that vision to fruition. Along the way the vision was adapted, as all visions are, to meet the prevailing conditions. The process of implementing ZPortal enabled us to clarify and refine our strategies for dealing with a growing multiplicity of electronic resources and access points. It is the hope of the authors of this paper that the gaps we have identified between the vision for and the reality of portals, as we experienced them, will assist our own and other academic libraries in the continued pursuit of search portals that will streamline the workflow and even enhance the experiences of our users in the electronic environment.

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