Digital Directions in Academic Knowledge Management: Visions and Opportunities for Digital Initiatives at the University of Toledo

Arjun Sabharwal
University of Toledo, arjun.sabharwal@utoledo.edu

Follow this and additional works at: http://utdr.utoledo.edu/library-research

Part of the Library and Information Science Commons

This Article is brought to you for free and open access by the University Libraries at The University of Toledo Digital Repository. It has been accepted for inclusion in Library Research by an authorized administrator of The University of Toledo Digital Repository. For more information, please see the repository's About page.
Digital Directions in Academic Knowledge Management: Visions and Opportunities for Digital Initiatives at the University of Toledo

Arjun Sabharwal
Digital Initiatives Librarian
The University of Toledo

Abstract

The expansion of the Digital Initiatives program beyond archives and special collections is creating new paradigms and opportunities in collaboration across the University of Toledo. Shifting economic realities and priorities, however, have prompted academic institutions to realign services in support of online learning, electronic publishing, and other high-priority strategic goals. Legacy projects to digitize collections of photographs, recordings, rare books, historical newspapers, and maps remain important, but archives and academic libraries may consider new directions in academic knowledge management. In fact, strategies and practices rooted in knowledge management may help academic institutions develop innovative services and resources, promote new paradigms for collaboration, improve workflows, and operate more efficiently.

This paper focuses on Digital Initiatives projects the University of Toledo Libraries undertaken during its first year. The paper presents definitions and key concepts in knowledge management (KM) and addresses how institutions can use academic knowledge management as a context for the DI program. Three knowledge domains—scholarly, curricular, and operational—characterize and distinguish academic institutions from other organizations. The intellectual landscape of interdisciplinarity presents opportunities for academic libraries to engage with faculty. Finally, the discussions of University of Toledo Digital Initiatives projects demonstrate that a DI role in academic knowledge management is a viable strategy, and underscore the connection between knowledge management theory and practice in the selected projects.

Keywords: academic knowledge management, digital initiatives, academic libraries, special collections, knowledge architecture, knowledge domains, University of Toledo Libraries
Digital Directions in Academic Knowledge Management:  
Visions and Opportunities for Digital Initiatives at the University of Toledo Libraries

The expansion of the Digital Initiatives program beyond archives and special collections to support university-wide initiatives is creating new paradigms and opportunities in collaboration across the University of Toledo. Shifting economic realities and priorities have prompted academic institutions and their libraries to realign services in support of online learning, electronic publishing, and other high-priority strategic goals. Legacy projects to digitize collections of photographs, recordings, rare books, historical newspapers, and maps remain important, but archives and academic libraries may consider new directions in academic knowledge management. In fact, strategies and practices rooted in knowledge management may help academic institutions develop innovative services and resources, promote new paradigms for collaboration, improve workflows, and operate more efficiently.

As academic institutions focus on knowledge creation and rely on archives and libraries to support research and teaching, academic knowledge management will help institutions to add more value to the educational programs. Like some library departments, Digital Initiatives is truly interdisciplinary in its scope of activities, and can collaborate in projects across the knowledge domains—scholarly, curricular, and operational—encompassing the university community. Thus, it can collaborate with teaching faculty, educational technologists, administrators, librarians, archivists, and others.

This study focuses on Digital Initiatives projects the University of Toledo Libraries undertaken during its first year. Although the initial scope of the DI program did not include a role in academic knowledge management, there is sufficient evidence and reason to support exploring new directions for the DI program. The study proceeds through three sections: The literature review presents definitions, key concepts, and strategies in knowledge management (KM) with a focus on knowledge creation, conversion, and transfer. DI skill sets such as digitizing, metadata creation, and building digital libraries are particularly relevant to these areas of KM practice. Although knowledge management is rooted in business practice, this study will strictly focus on its academic application only. Next, the discussions address collaboration across knowledge domains, disciplinary boundaries, and the effect of such collaboration models on faculty-librarian relationships in this environment. Librarians supporting interdisciplinary research may consider using integrative approaches to the liaison system and creating virtual subject guides. Finally, the descriptions and discussions of Digital Initiatives projects demonstrate that a DI role in academic knowledge management is a viable strategy, as these projects underscore the connection between theory and practice in the selected projects. Knowledge management theory in particular presents a critical foundation and framework for experiments and approaches in the present context, as the DI program is new with very few applicable models to consider for a future direction.

Literature Review

Knowledge management as a discipline and practice in the business environment has received considerable coverage in professional literature from the 1990s to the present. As one of the leading examples, the Honda City experience of the late 1970s (Nonaka & Takeuchi, 1995) illustrates the success of knowledge management, which allowed companies to capture and reuse the knowledge and intellectual capital created by employees with the use of knowledge creating, conversion, and transfer techniques. A growing body of works also addresses the potential value
of knowledge management in academic libraries where knowledge management strategies could add value to library services and resources (Branin, 2009; Townley, 2001; Jantz, 2001; Kim, 2000). Although current research may well be underway, thus far, virtually no work has applied knowledge management theory as a framework for digital initiatives programs. Therefore, a number of seminal and other important works in KM theory and practice (Nonaka & Takeuchi, 1995; Zeleny, 1987; Ackoff, 1989) have shaped the scope and concepts behind some DI projects at the University of Toledo.

Knowledge management definitions

Most circulating definitions place emphasis on the relationship of three key components of knowledge management: people, process, and technology. “Knowledge” as concept connected to familiarity, experience, and association has been the focus of philosophical works for at least two millennia. In modern KM context, however, it refers to the know-how and is differentiated from data (know-nothing) and information (know-what) by Zeleny (1987) who regards knowledge as the strategic basis for action with the benefit of having data and information.

Petrides and Nguyen (2002) define knowledge management as “the combination of people, processes, and technology that come together to promote a robust system of information sharing, while guiding organizations toward ongoing reflexivity and learning” (p. 25). Townley (2001) defines it “as the set of processes that create and share knowledge across an organization to optimize the use of judgment in the attainment of mission and goals” (What is knowledge management section, para. 1). Kim (2000) defines knowledge management is “discipline that promotes an integrated approach to identifying, managing, and sharing all of an organization's knowledge assets including unarticulated expertise and experience resident in individual workers” (p. 3). An earlier definition by Auster and Choo focuses on libraries where “the basic goal of knowledge management is to harness the knowledge resources and knowledge capabilities of the organization in order to enable the organization to learn and adapt to its changing environment” (as cited in Kim, 2000, p. 3). As many organizations, including libraries, struggle to survive, the theme of adaptability remains crucial. While knowledge management has not received due attention in academic libraries, authors (Kim, 2000; Jantz, 2001; Branin, 2009) advocate for a greater awareness and integration of KM techniques and strategies in library work.

The meaning of “academic knowledge management” varies by institution, as the value of a KM program and its potential contributions depend on the intellectual and structural framework. In the context of higher education, this study postulates that “academic knowledge management” is an extension of knowledge management, its theories, and practices with a focus on organizational culture, structure, mission, and core values. As no two universities are identical in these respects, academic knowledge management will evolve differently even in two comparable communities.

A definition of “academic knowledge management” could also enter discourse at the cross-section of various knowledge domains in the academic environment. With respect to the scholarly domain more specifically, interdisciplinarity presents new opportunities for collaboration among archives, libraries, teaching faculty, and other staff. Therefore, Kim’s definition (2000) is suitable, but this study proposes that the definition should apply to collaborative environments and include working groups, task forces, and committees involving students, and volunteers in addition to the “individual workers.” An intellectually active academic community presents a rich context for academic knowledge management projects and DI participation.
Knowledge management in academic libraries

As archives and academic libraries directly support knowledge creating activities at their parent institutions, we would expect that they would also be interested in knowledge management, but several studies suggest otherwise. While academic libraries have utilized KM techniques (Townley, 2001) they have done little to apply them to improve operations and resources. Some knowledge management techniques such as organization and description have roots in library science. According to Broadbent (1998), however, “knowledge management is not about managing or organizing books or journals, searching the Internet for clients or arranging for the circulation of materials [but] these activities can in some way be part of the knowledge management spectrum and processes” (p. 2). In his editorial, Branin (2009) advocates for a greater integration of knowledge management in libraries in order to “extend the range of their capabilities and expertise well beyond the traditional, almost exclusive, focus on collecting and servicing the formally published scholarly literature” (p. 104).

Academic libraries will need to increase their efforts in this area if they wish to benefit from KM programs however. The lack of organized progress across the library profession has been noted by Serban and Luan (2002) who point out that “since higher education is about the creation, transformation, and transmission of knowledge, such oversight is striking” (p. 13). Nevertheless, they acknowledge efforts by colleges and universities integrating knowledge management into their operations. Jantz (2001), who describes KM approaches at Rutgers University, identifies new opportunities for libraries that can integrate KM strategies into their routines in order to add more value to library services. Strategies primarily associated with businesses can benefit the libraries aiming to operate more efficiently. In other words, there would more return on investment from stakeholders and the user community. Libraries now expected to operate more cost-effectively can apply lessons learned from the business community and adopt business models to remain sustainable.

Knowledge architecture

A knowledge architecture presents the structural context for KM processes and strategies such as knowledge creation, conversion, and transfer. This study considers two basic models for knowledge architecture: one focusing on components, and another one focusing on processes (knowledge access and exchanger) and outcomes (learning). Applehans, Globe, and Laugero (1999) present a model of knowledge architecture that joins three components—content, people, and technology—into a cohesive working relationship that is critical to maintaining vital workflows throughout an organization. In this model, the people with knowledge develop the content that is delivered (to other people) with the help of technology. Elsewhere (Wallace, 2006), another model for knowledge architecture brings repositories, communities of practice, and the learning process into a cohesive workflow to support knowledge access and exchange. Understanding these two perspectives on knowledge architectures are important to planning DI projects where people, content, and technology are inseparable from a community of practice using repositories to facilitate knowledge access and exchange.
Knowledge creation

Knowledge creation is a core concern in knowledge management. Knowledge represents the content in the knowledge architecture; therefore, knowledge creation is crucial in a system focusing on processes like knowledge sharing, learning, and innovation. Without people and knowledge, initiating these processes would not be possible. Nonaka and Takeuchi (1995) place the individual at the center of the knowledge creating process whereas the organization plays an instrumental role in projecting that knowledge to co-workers, management, and stakeholders through networking.

Nonaka and Takeuchi (1995) also identify two dimensions of knowledge creation: epistemological and ontological. The former dimension involves four methods for developing new knowledge as models for learning through research, listening, and participation. The latter dimension builds on the hierarchy and relationships of knowledge-creating units, thus outlining a structure for knowledge creation. For example, knowledge created by reference librarians may dovetail with knowledge needed by colleagues in other library departments. A reference log may provide important clues to Information Literacy librarians about what to address in future BI sessions, and present action items to acquisition librarians purchasing collections. Software such as Libstats may facilitate this process. Knowledge created with the help of purchased, subscription-based, and locally developed digital resources will directly contribute to the quality of learning experience through classroom and electronic discussions, eventually leading to new knowledge within a functioning architecture.

Knowledge conversion

Knowledge is stored in the mind in an intangible and personal form, and converting this knowledge into a tangible, concrete, publishable form occupies a central place in KM literature and practice. Polanyi (1966) identified two cognitively based states of knowledge: tacit and explicit knowledge where the former is intangible and develops in the mind while the latter is public and tangible. Nonaka and Takeuchi (1995; see also Kim, 2000) build on Polanyi’s psychological approach in their clarification of these two types of knowledge: “Tacit knowledge is personal, context-specific, and therefore hard to formalize and communicate. Explicit or ‘codified’ knowledge, on the other hand, refers to knowledge that is transmittable in formal systematic language” (Nonaka and Takeuchi, 1995, p. 59). There are four knowledge conversion methods to convert tacit knowledge to explicit and back:

1) Socialization: akin to mentoring or teaching where tacit knowledge remains in tacit form;  
2) Externalization: akin to presenting and lecturing where tacit knowledge becomes explicit.  
3) Combination: central to formal learning and research activity where explicit knowledge remains explicit when the results are published; and  
4) Internalization: akin to hands-on learning where published instructions and information are processed in the mind and generate new tacit knowledge.

These methods are common in classroom and demonstrate that a library’s digital resources can enrich the learning process through research, participation, discovery, and analysis in the classroom, during a field projects, or in other situations. These techniques can be effectively transferred to the digital environment where digital libraries can facilitate discovery and learning through constructivist methods. In relation to online learning, Dalgarno (2000) and Marshall,
Chen, Shen, and Fox (2006) found that students learn best through collaboration and discovery, which are the strengths of the constructivist learning theory. Since “constructivism focuses on the process by which people acquire knowledge…through active exploration…in a social context” (Dalgarno, 2000, p. 2), we can identify a connection between constructivism and knowledge conversion in academic settings. Digital resources in the online learning environment can directly influence the learning process, and the Digital Initiatives program has a potential role here.

**Knowledge transfer**

When teams complete and close a project, their knowledge is captured in the form of field notes, photographs, recordings, and other digital assets. This explicit knowledge is ready for transfer into storage from where users can retrieve and reuse that knowledge in a future project. Knowledge transfer requires teams and individuals to interact, communicate, exchange knowledge, and manage workflow through the knowledge architecture. The proximity of these teams affects the process of transferring knowledge across an office, a larger organization, or an even larger geographic region.

Milton (2005) identifies three methods of knowledge transfer 1) Serial transfer, which occurs with successive projects in the same location; 2) Parallel transfer, which occurs between simultaneously managed projects where the intermediary can facilitate transfer and cross-fertilize ideas; and 3) Near and far transfers, which occur in similar or different contexts (such as location), respectively. Digital archives, internal repositories, and other storage mechanisms can greatly facilitate knowledge transfer once all legal issues surrounding intellectual property and copyright protection are resolved. Since DI departments can be instrumental in creating digital libraries in collaboration with systems librarians and information technologists, a potential role of the DI program in this area of knowledge management is evident.

**Academic knowledge management as context for digital initiatives**

Knowledge management theory offers a broad foundation for new services and processes in the academic library and throughout the university. With knowledge of emerging technologies and new possibilities, the Digital Initiatives department can play a constructive role in facilitating the knowledge creating, conversion, and transfer process across the organizational spectrum. In other words, while the DI department will not manage knowledge itself, it can support other departments’ initiatives to manage what they know. For instance, the development of a Common Knowledge Database (Jantz, 2001) would benefit entire teams by being able to share the knowledge of more experienced librarians. Libraries can also develop databases and use Web applications to log reference questions and locate answers that have helped patrons in the past. Archives use Archivist Tool Kit to manage knowledge of collections in their departments, and Microsoft Access is suitable for developing customized databases to manage data, information, and knowledge in archives (Sabharwal, 2009).

**Knowledge domains**

This study identifies three distinct but interrelated knowledge domains: scholarly; operational; and curricular knowledge domain. The first domain refers to academic subjects, the second one results from creating and sharing routine- and process-based knowledge at the workplace, and the third one is related to course design and administration. “The term knowledge domain refers to the part of the world investigated by a specific discipline. In other words, the
domain can be characterized as the object (e.g., plants, numbers, or the past) of a specific body of knowledge (e.g., botany, mathematics, or history)” (Maggioni & Alexander, in press, p. 1). Each domain generates its own discourse, and one of the salient objectives of academic knowledge management will be to cross-fertilize discourse in these domains through dialogue and collaboration. Academic knowledge management equally considers organizational culture, mission, structure, and stakeholders in its methodology aiming to integrate these domains. It can also involve the DI program in all three domains through various forms of collaboration. The discussion of the scholarly domain is especially important due to the growing emphasis on interdisciplinarity, collaboration, and innovation at academic institutions.

**The scholarly knowledge domain and interdisciplinarity**

Scholarly knowledge is at the focus of such academic activities as teaching, research, and learning. Knowledge exchange among faculty, students, and others takes places in a variety of venues including the classroom, conferences, discussion forums, and blogs. Additionally, the professional associations play a critical role in creating these opportunities to maintain professional identity within these organizations, facilitate knowledge exchange between members of the association, and to enrich the professional experience of entering scholars. Each subject area builds on core epistemologies, methodologies, and practices, which have defined disciplinary boundaries for several centuries now. In the past century, however, there has been a trend to cross these boundaries in pursuit of new knowledge, methodologies, and theories (Klein, 1990). The shift away from monodisciplinarity towards interdisciplinarity has become the starting point for creating new scientific paradigms, problem-solving strategies, and nascent new data.

Disciplinary boundaries have significantly eroded since the 1920s, as researchers began to collaborate and explore integrative approaches. Klein (1990) identifies four integrative methods—i.e., crossdisciplinary, multidisciplinary, interdisciplinary, and transdisciplinary—with different impact on theory and methodology. Crossdisciplinary methods involve viewing topics in one discipline through the perspectives and methodologies of another while multidisciplinary work involve juxtaposing several disciplines without any aim at integration or creating a new discipline, epistemology or scientific paradigm (Klein, 1990). Interdisciplinary and transdisciplinary methods involve progressive degrees of integrating methodologies and epistemologies with the intent to create new disciplines, epistemologies, and paradigms. In fact, transdisciplinarity accomplishes that by breaking down disciplinary barriers to a greater extent than previous methods do. Aram (2004) regards these as different degrees, or gradations, of integrative intellectual work. According to Aram, “conceptualizations of interdisciplinarity generally recognize differences in the intellectual work that occurs in relation to given disciplines; some forms of interdisciplinarity involve more comprehensive, profound, or complete integration of disciplinary knowledge and methods than other forms.” (p. 382).

Library (including Digital Initiatives) support can be vital in this terraced intellectual environment because, according to Palmer (1996), integrative approaches influence how researchers seek and use information. While most interdisciplinary project is collaborative in nature, those engaging in solo work may not be equally knowledgeable in all the subject areas and related sources of information. According to Palmer (1996), “knowledge is centered around an intellectual core and, at the same time, overlaps in the periphery through scatter. Compared to discipline-based inquiry, cross-disciplinary research puts more emphasis on information in the peripheral information” (p. 183). Given the variety of integrative approaches, these methods will
utilize these regions differently, and Palmer points out that these differences will affect the use of library resources. Researchers will seek sources for the peripheral areas differently than they would for information in the core, and will have less knowledge of information resources such as research databases. Therefore, libraries can provide valuable service to support interdisciplinary research by approaching the liaison system more collaboratively, and this is where cross-domain strategies must develop.

**Crossing the knowledge domains**

While interdisciplinary research continues to transform academia and industry, academic knowledge management is not only about the scholarly knowledge domain. This study approaches academic knowledge management with a vision that it can integrate knowledge from the operational as well as curricular knowledge domains as well. At this point, however, the DI program has not been involved with the latter except for a project proposal to merge a Web project with the university’s administrative software, Banner, to allow faculty and presenters to access views of classrooms when searching this system.

At an optimum level, academic knowledge management can present opportunities for collaboration across the three knowledge domains. What faculty knows can improve the work of librarians, technologists, online course designers, administrators, and other support staff. Likewise, knowledge in operational and curricular knowledge domains can directly influence the quality of learning experience, teaching, research, and knowledge exchange in the scholarly knowledge domain. These collaborative relationships can present the Digital Initiatives staff to participate in innovative projects with a positive impact on teaching, learning, and research at the academic institution.

Liaison systems at university libraries facilitate interaction between academic departments and their assigned subject liaisons in the library, thus promoting collaboration across the scholarly and operational knowledge domains. Librarians and faculty meet periodically to share knowledge and address information needs to improve the quality and relevance of library resources including research databases, virtual exhibits, digital collections, and subject guides. Faculty can advise librarians about new works to be included in the library collection; in return, librarians offer operational knowledge including usage statistics and other data to advise faculty about past usage and experiences with certain collections. Academic libraries can provide these resources to enrich students’ academic experiences through informed analysis and discussions in classrooms, online discussion forums, tests, and research papers. Macaluso and Petruzzelli (2005) equally emphasize the need to develop strong relationship with faculty through improved communication, knowledge exchange, and liaison activities. Faculty will also benefit, as library resources will add value to their lectures and raise the quality of course material.

According to Palmer (1996), libraries play a significant role in supporting interdisciplinary research. Internally, libraries have established a liaison system with subject librarians involved in collection development and expected to support teaching, learning, and research in the assigned academic departments. Externally, these liaisons may want to apply the various integrative approaches to their work on subject guides. In the past, subject guides for single subject areas (e.g., Art, Music, Geography, Biology) helped library users locate resources in those areas. With the rise and spread of interdisciplinary research, however, subject liaisons may best support discovery and learning through new models for library guides. Palmer’s work on the effect of interdisciplinary on solo researchers will apply to librarians; therefore, librarians should also
pursue collaborative solutions to support interdisciplinary research. For instance, subject guides for music therapy, geographical information systems, or renewable energy will benefit from collaboration among subject liaisons and teaching faculty in these areas. Librarians working alone may not have equal knowledge of all areas involved in interdisciplinary research. To illustrate this concept, we can consider subject liaisons (to science, business, and engineering) at the University of Toledo who have collaboratively developed a subject guide to support research and teaching in the new Solar and Renewable Energy program at the university. The multidisciplinary guide became a convenient resource offering resources from multiple disciplines using the liaisons’ subject knowledge.

**Digital Initiatives projects at the University of Toledo**

The various DI projects underway at the Canaday Center for Special Collections and in other areas of the University Library illustrate the extent and diversity of academic knowledge management activities in plan for the DI program. With digital technology, the DI staff can develop databases, digital libraries, information resources, and facilitate processes that invite collaboration across various knowledge domains. Marek (2008) reports that libraries are in the position to develop information products such as digital libraries, which is vital to any role in knowledge management. Digital libraries can be relevant to specific research interests, and the ease of access makes them an essential KM tool, Marek reports. A digital library proposed by the DI Librarian at the University of Toledo will allow faculty to organize and archive media files and documents for teaching purposes. Thus, library-faculty collaboration could effectively contribute to developing information products like digital libraries accessible from the Web and online course management systems such as Blackboard.

The progressively expanding scope of these collaborations is illustrated in the order that the projects are discussed below. Canaday Center projects are narrow in scope due to a small staff and few functional specializations. In contrast, the projects in other areas of the library and across the institution are broad because they can potentially engage participation from more people from a broader range of knowledge domains and disciplinary backgrounds.

**Archival finding aids**

Archival finding aids are critical tools for navigating a repository’s collections and a record of personal knowledge developed during collection processing. Archival collection processing involves extensive research, interviews, and correspondence with donors, and this process can contribute to rich personal (or tacit) knowledge. Standard finding aids contain historical or biographical information about a person or organization, scope and content notes, provenance information, and a detailed inventory organized by boxes, folders, and items. Processing notes and references to related collections are also part of the standard format. Special collections contain primary source material in the form of writings, recordings, or photographs, which contain knowledge in tacit form. After processing a collection, this knowledge is transferred to a finding aid published in electronic form and becomes explicit knowledge. The Digital Initiatives Librarian then converts these documents into HTML, EAD, and PDF formats. Small archives often employ students (usually with a history background) who also develop tacit knowledge, which then converted into explicit, and this knowledge is transferred to findings aids.
Applications like MS Access, Archivist Toolkit, and Archon allow archives staff to operate more efficiently with better knowledge of the collections. The outcomes include researchers’ ability to use these finding aids to gain knowledge of what is in the collection and then convert tacit knowledge into explicit through formal publications. For example, a labor historian will be interested in the tacit knowledge of labor leaders, union officers, and others to publish an article or monograph where that knowledge gains an explicit form. Therefore, finding aids present a simple but effective way to transfer knowledge from the archivists to the researcher.

Archival database as knowledge management tool

A recent archival database management project using Microsoft Access has aimed to consolidate data, information, and tacit knowledge of archives staff into a searchable form in order to enable querying and reporting in the archives. The concept was that the director and staff enters data, information, and tacit knowledge, and converts that knowledge into explicit knowledge through the director’s reports, presentations, and publications (Sabharwal, 2009). Knowledge of issues related to specific collections (such as missing, damaged, and misplaced items) will also generate action items to repair and digitize items requiring remedial attention.

Building this database required discussions and collaboration with archival staff. In order to develop a database that would keep aggregated data from patron registration and other datasets, it was important to find out about routines and workflows that could serve as model for the database. The database developer (the Digital Initiatives Librarian) received valuable input from the Canaday Center staff, but it was ultimately determined that the fullest implementation and use of such a database would require significant competency with Microsoft Access and designated staff to maintain the datasets. Instead, a truncated version of the plan was implemented for immediate use with a possible implementation of the product later as needed.

A database like this would support knowledge transfer of the “near transfer” type also because of the similar context for all related projects. The proposed outcome for this project would have been that data could be used to identify critical issues with the collection and decide on maintenance with evidence presented in the data. This project best demonstrates the continuum from data to information, knowledge, and wisdom (Zeleny, 1987; Ackoff, 1989) in the archival context to develop strategic plans with the benefit of timely data at our fingertips.

The Geospatial Knowledge Archive

The idea of developing a Geospatial Knowledge Archive was proposed to the Department of Geography and Planning faculty and staff as a database to organize, store, and retrieve project documentation created during the active phases of geospatial projects. Documentations would contain tacit knowledge including team members’ personal experiences, field notes, photographs, interviews, unpublished reports, and critical lessons learned by the entire team. The database would not only serve as a knowledge archive but as knowledge transfer mechanism also. The archive would facilitate both types of transfers, near and far (Milton, 2005). The former would occur between teams working in identical departments or similar projects such as investigating terrain for residential development. The latter would occur dissimilar teams transfer geospatial data, information, or knowledge and use them in different contexts.

Once a project is completed, the team would submit all the documentation that may be valuable to a new team. The aim of such an undertaking would be to provide access to project
documentation and minimize time and resources going into preliminary research for data, information, and knowledge. The outcomes would be considerable time and energy saved and with a tool like this, prospective project teams would make informed decisions with the help of tacit knowledge created in previous phases or attempts at projects. Such an archive would also facilitate collaboration on publications and presentations, thus converting tacit knowledge into explicit.

Libguides projects

The idea of a Geospatial Knowledge Archive gained support from Geography and Planning faculty. However, their immediate needs included access to publicly available geospatial datasets from federal, state, independent, and international agencies. In response to this request, the DI Librarian collaborated with the subject liaison to geography, anthropology, and sociology, and produced a Geographic Information Systems (GIS) guide to deliver data, information, and knowledge—three key elements in knowledge management (Zeleny, 1987; Ackoff 1989)—to faculty and students. The guide featured links to research databases, geospatial datasets from local, regional, national, and global data sources.

In terms of disciplinary scope, the field of Geographic Information Systems is a transdisciplinary one, as it takes geography, technology, economics, engineering, and environmental sciences, and presents researchers and practitioners with data, information, and knowledge. Although in the initial stages, the design and structure of the guide reflected a multidisciplinary area, we have been progressing towards a stage where these interdisciplinary relationships were further integrated into each page of the Libguide through hyperlinks. The topic of representing the ontology of a discipline in the guide design would be important, given that liaison work for interdisciplinary areas should match the scope of the research area supported, but that concern is beyond the scope of this study.

Various other Libguide projects, such as those discussed earlier under cross-domain knowledge exchange, have been proposed by the DI department. Libguides is a virtually shared platform that allows academic librarians to create or collaborate on creating virtual subject guides to support research, teaching, and learning. Using the Libguides platform, The DI Librarian has recently collaborated and successfully completed the Intellectual Property Portal with data, information, and knowledge pertaining to intellectual, legal, and technical aspects of intellectual property, including copyright, patents, trademarks, plagiarism, and citing sources. The project well illustrates cross-domain and interdisciplinary collaboration, as the DI Librarian has invited participation from various library departments including the director of library services, director of library outreach and assessment (who also teaches copyright), health science librarian, engineering librarian, government documents librarian, and information literacy librarian. The portal spans several subject guides via hyperlinks to separate guides on Patents (by the Engineering Librarian) and Citation Guide (by the information literacy librarian). Collaborators have owner-level access to edit and update this resource periodically. This project has demonstrated that the library community is intellectually prepared and technically equipped to plan and undertake academic knowledge management initiatives and present the institution with resources that faculty and students will use in their lines of teaching and research where knowledge, information, and data are critical. The experience has also reaffirmed the constructive role the DI program can play in such initiatives.
Overview of knowledge architectures and outcomes for DI projects

Knowledge architecture provides a structural context for knowledge creating activities bringing people, content, and technology into a cohesive, collaborative environment. The outcomes of these projects include promoting knowledge access and exchange through the digital content developed in these projects. For the DI projects in particular, the architecture consists of five regions, or secondary architectures, where the DI Librarian engaged with different people, creating different content, and using a variety of technologies. Some of these regions—Canaday Center, Digital Resource Commons, and Toledo’s Attic—overlap due to shared content, but in the present case, that has advantage because of consistency in quality of digital content and metadata. An overview of the knowledge architectures and corresponding outcomes aims to supplement the DI project descriptions:

1. Canaday Center for Special Collections:
   People: the center’s director, a manuscript librarian, a support staff, student employees
   Content: finding aids, digital collections, and virtual exhibits.
   Technology: Serena Collage content management system, Web server
   Audience: faculty, students, staff, independent researchers, general public
   Outcomes: access to local history knowledge, primary sources, and university archives

2. University Library and Digital Initiatives Department:
   People: librarians, media specialist in the DI Department
   Content: subject guides and portals, virtual exhibits
   Technology: Serena Collage content management system, Web server
   Audience: faculty, students, general public
   Outcomes: access to data, information, and knowledge in various disciplines

3. Department of Geography and Planning (still in a state of proposal)
   People: DI Staff, Systems Librarian, Liaison to Geography, and interdisciplinary faculty
   Content: geospatial knowledge, GIS digital assets.
   Technology: Zentity (digital library)
   Audience: faculty and student in GIS and related fields, field survey teams
   Outcomes: access to geospatial knowledge to GIS field teams

4. OhioLINK/Digital Resource Commons (DRC):
   People: Digital Resource Management Committee members
   Content: Canaday Center digital collections; Toledo’s Attic collections and exhibits.
   Technology: DSpace
   Audience: faculty, students, staff, independent researchers, general public
   Outcomes: access to primary sources of historic and cultural orientation
5. Toledo’s Attic Virtual Museum Project

**People:** Steering Committee from Canaday Center, Toledo Public Library, the Maumee Valley Historical Society, WGTE Public Broadcasting TV station, and local history authors.
**Content:** Collections from the Canaday Center, Toledo Public Library, WGTE, and privately donated digital material.
**Technology:** Media system developed by WGTE technologists
**Audience:** local historians, private citizens, K-12 educators, and students
**Outcomes:** access to local history focusing on industrial and commercial history, genealogical resources, and various research tools.

These projects illustrate the breadth and depth of DI involvement throughout the university and the communities of Northwest Ohio. While Canaday Center, Toledo’s Attic, and OhioLINK projects evidently focus on content in the scholarly knowledge domain—most typically history—other project illustrate how a digital library can provide access to tacit and explicit knowledge. From a macro perspective, these efforts are isolated and targeted to specific audiences, and may contribute to a growing silo effect. From the micro perspectives, however, these projects demonstrate the potential for the DI program to grow incrementally. With the combined use of human and artificial intelligence (via the Semantic Web), these resources will be accessible and easily navigable sometime in the not-so-distant future.

**Conclusion**

The Digital Initiatives program at the University of Toledo is still very new, but it is possible to point to a few critical lessons learned at this early stage. In discussing the Digital Initiatives experience at the University of Toledo, I attempted to demonstrate that the DI program, in fact, could support initiatives well beyond its originally intended scope and mission. A review of knowledge management literature and the success with various DI projects demonstrate that the program could play a visible role in academic knowledge management. The expansion of the DI program from its roots in the archives to university-wide collaboration has great potential, but such a broader scope will require more administrative, technical, and collegial support in the academic library and other offices.

Structural integration of the DI department into the organization would not only facilitate but also promote collaboration on various projects. The outcomes of integration efforts include future collaboration on publications and presentations. In fact, my ability to collaborate with staff at the Canaday Center was possible because integration took place at the beginning, and that has resulted in extensive digitization projects, collaboration on physical and virtual exhibits, and conference presentations also. Knowledge architectures can directly influence the outcomes of projects when people, content, and technology come together to facilitate knowledge access, exchange, conversion, and transfer. Once institutions of higher education promote digital collaboration across their knowledge domains, they will be able to build on their own capabilities and strengths to manage academic knowledge in more innovative ways.
References


