



DECISION METHODS FOR VIRTUAL KNOWLEDGE COLLABORATION FOR RESEARCH, TEACHING, AND LEARNING

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ABSTRACT

Virtual models of knowledge collaboration and access abound in research libraries, but as we move into the 21st century we are developing new ways for strategically advancing knowledge collaboration more broadly and creatively within the research library context. Three areas will be addressed as examples of decision models. First, collaborative decision making to create knowledge rich organizational structures will be discussed. Second, creation of new forms of knowledge through virtual publication by collaboration will be reviewed. Third, development of collaborative learning, teaching, and research spaces will be addressed. Conclusions encompass future-oriented models for knowledge collaboration and access which transcend individuals and organizations.



INTRODUCTION

Knowledge creation is a global phenomenon and increasingly produced, accessed, and preserved in the virtual, digital environment. Decision making to improve our collective ability to advance these virtual knowledge systems needs to be collaborative and transcend departmental, institutional, governmental, and organizational boundaries. The study of decision making and leadership in the exploding virtual world requires is complex given the changing nature of leadership roles, the multitude of social technologies, and ever higher expectations for results. For example, Cummings (2008) found from empirical evidence of 129 virtual workgroups that their leaders mitigated problems caused by geographical dispersion through greater communication. Earlier in the history of virtual collaboration Romano (1998) found that achieving a sense of presence within the virtual world provided an experience close to that in the real world.

Scholarly inquiry is the key activity underpinning knowledge creation. Research universities are at the nexus of the process and steward the end result. Research libraries, virtual and physical, play a critical role in knowledge creation as the iconic environment for access to scholarship and creative work leading to new scholarship. New technologies for group work and social networking are making it possible for research libraries to develop, through collaboration, tools to support new methods of collaboration. New and emerging trends in global research reflect a growing trend towards virtual laboratories of dispersed experts working on interdisciplinary problems. These laboratories or virtual organizations require support and coordination. Research libraries are beginning to understand their role in providing expertise on appropriate communication systems, data management, access, and preservation. Sciences, social sciences, and humanities formulations of what is often referred to as cyberinfrastructure are emerging at different levels and on different scales. Collaborative support in research institutions, research libraries, and governmental agencies is key to developing the support mechanisms needed for sustainable cyberinfrastructure. Lynch (2008) notes:

Probably the greatest challenge of cyberinfrastructure at the campus level will be the design and staffing of the organizations that will work with the faculty: helping faculty access cyberinfrastructure services locally (and, when necessary, globally); assisting faculty in managing their data – including observational data, the construction of research and reference collections, or data from analysis or simulation – and preparing this data for handoff to appropriate data repositories and curators at the appropriate time; and aiding faculty in parallelizing computations or organization data for reuse, mining, and mashups. Staff will be needed to assist in the setup of virtual organizations and also to help with their breakdown.

Collaboration internally and externally will be needed in defining, shaping, and financing a suite of services basic to running a 21st century virtual organization.

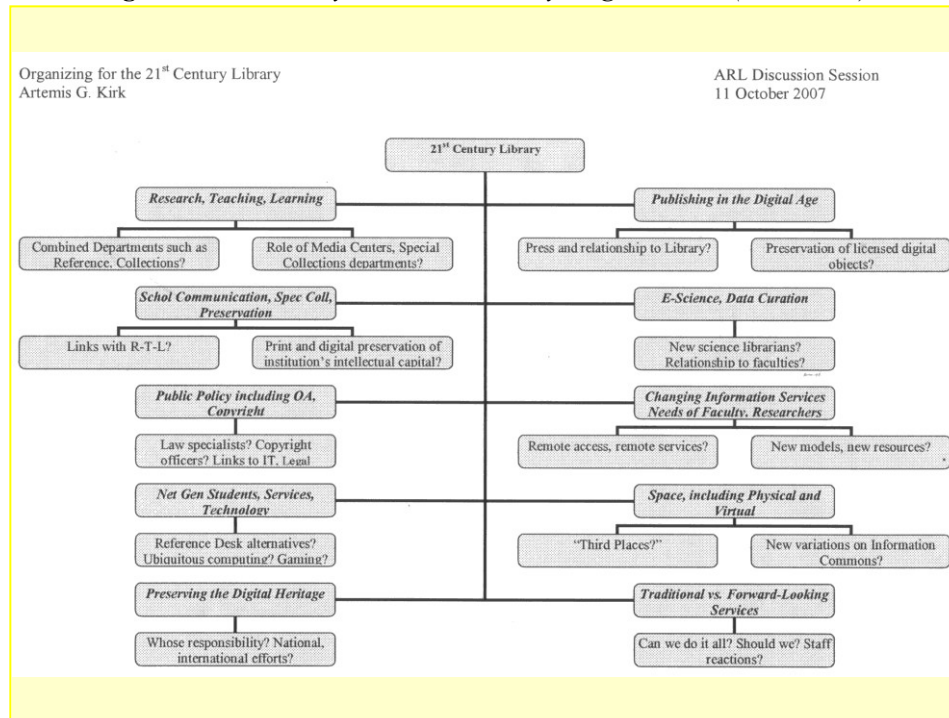


Organizing for Successful Collaboration

How institutions are organized can be a significant barrier to collaborating with 21st century technologies or even 19th century technologies. Hierarchical organizations where information typically flows in one direction run counter to the diffuse nature of collaborative communication. Organizations tend also to be set up to address a workflow based on the organization's success rather than on success from the user or customer point of view. In the case of research universities, the customer is students and faculty. The product is positive teaching and learning as well as productive and meaningful research which advances humanity. Today's organizations are often more concerned about how technology or other forces affect them rather than how these forces change the behavior of their customers. This is especially true in research universities where cutting edge discovery and scholarship is occurring within an organization encrusted in tradition.

Organizing for the 21st century requires rethinking approaches and connections to meet current and future needs. Figure 1 is a futuristic model of 21st century research libraries' functions and areas of concentration based on new ways of teaching, learning, and research. Aspects of the model are currently emerging in research libraries around the globe. The model includes attention to teaching and learning, scholarly communication, innovative user-based services, special emphasis on e-science, special collections, public policy. It questions many traditional services still lingering in research libraries and addresses the potential reactions of staff to the changes which are essential to an effective transfer of knowledge in the 21st century.

Fig. 1. – 21st Century Research Library Organization (Kirk 2007)



Research libraries are beginning to reconsider their organizational structure in terms of shifts in student and faculty behavior as they go about their work. And, this reconsideration has at its core the notion of collaboration. Luce (2008) notes that “libraries can be convenors that establish a commons ground among different players. Collaboration and partnering are essential in the eResearch environment.” Other shifts include preference for digital scholarship, existence of social, cultural, and intellectual virtual and physical spaces, changes in where research and teaching is occurring, and the need to be connected to resources from multiple locations. Libraries, therefore, should organize themselves by the unique needs of different user populations rather than primarily by function. For example, undergraduate students have a different suite of needs than graduate students and faculty. Scientists have different ways of working than humanists, and use scholarly resources differently.

Figure 2. - *University of Tennessee Libraries' Traditional Organization*

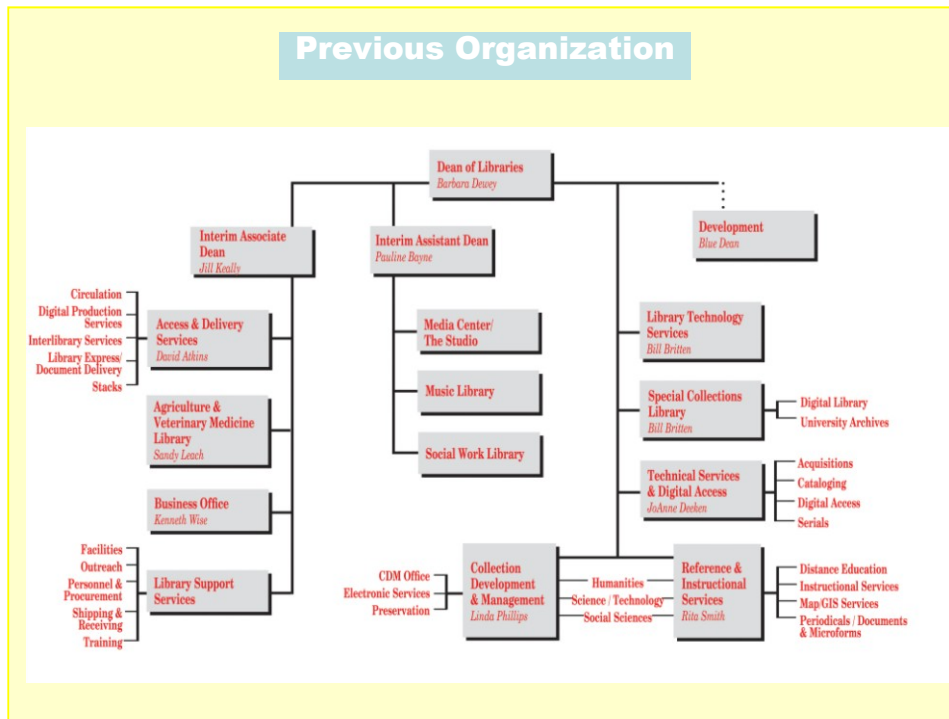
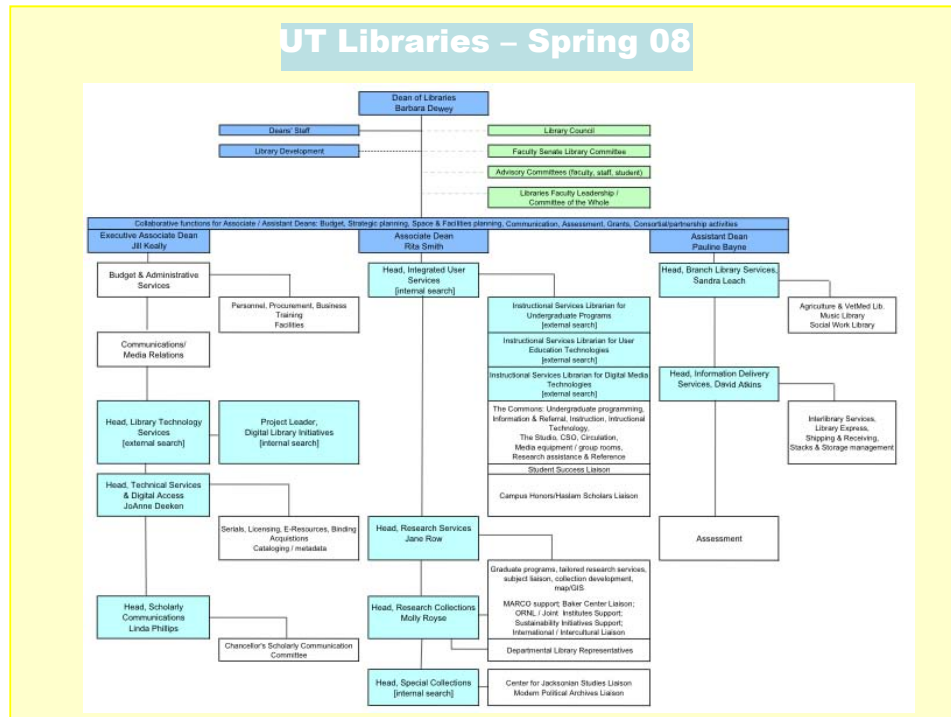


Figure two and figure three illustrate the transformational changes made in the University of Tennessee Libraries based on unique user group needs, the growing dominance of digital formats, and the imperative for stronger connections to the research enterprise. Changes These changes are reflected in newly configured departments and the connection of key university research centers which would especially benefit from collaboration and liaison activities with the library.

Figure 3. UT Libraries' New Organizational Structure



Rethinking Virtual Organization through Collaboration

An overarching shift relating to connection, collaboration, and technology is the need for large scale integration of digital resources that makes sense to a variety of user populations. Different “views” for different levels of use without regard for physical “location” of users or resources is in order. Major players in the information world are taking note and developing large-scale portals, some with social networking capabilities. OCLC’s WorldCat.org contains millions records from thousands of libraries across the globe. Through its portal users can locate books, articles, multimedia, digitized special collections, and items in other formats. The portal has interaction capabilities including the ability to create and share lists, build a bibliography and export them to citation software, and obtain search plug-ins for Facebook or Firefox. These tools help people find, comment on, and keep their resources handy in their browser of choice or personalized webpage.

Google, the most extensive portal of them all, is a tool of growing importance for locating scholarship in its Google Books and Google Scholar views which points to print materials held in libraries as well as the ever growing collections of digital books, reports, and journals. The entire Google suite of 44 tools includes many for sharing, collaborating, and communicating. These massive portals provide a way for individual library collections to be found where the users like to search. Individual libraries are



reshaping their webpages to also incorporate new ways of collaboration and communication with users who

Virtual Publication and Collaboration

Competition drives collaboration in the university environment although this notion seems like an irony. The quest for excellence and the ability to compete for the best and brightest students, faculty, and researchers on a global scale, is based, in part, on visibility of the intellectual output of the institution. Achieving maximum visibility of this intellectual output combined with the ability to articulate its impact effectively provides a catalyst for emerging methodologies, most based on collaboration.

An emerging form of virtual publication is the institutional repository (IR). According to Lynch (2003), "a university-based institutional repository is a set of services that a university offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members. It is most essentially an organizational commitment to the stewardship of these digital materials, including long-term preservation where appropriate, as well as organization and access or distribution." An IR, if it is to exist, must be developed collaboratively with scholarly producers (faculty, students, or researchers) and key administrators from research libraries, ICT, and research. Scholars provide the content and administrators provide the technical and software-based infrastructure. Institutional repositories are, therefore, emerging and potentially large-scale "publications" of a university's intellectual output.

Containing more than scholarship, the IR is also the intellectual memory of the University with archival materials from its past. Examples of IRs include University of Michigan's Deep Blue, whose motto is "Your work: cited more, safe forever. Deep Blue makes it simple." A key goal and primary motivation for institutional repositories is to promote scholarly output ensuring that it can be located easily (i.e. through Google Scholar, through regional portals, etc, and through traditional means in library catalogs and scholarly journals). IRs at a regional or national level are emerging, particularly in Europe. Spain's Recolecta de Ciencia Abierta is an important example of a portal which provides access to multiple university IRs throughout the country.

Digital publishing is another growing trend, based in part, on traditional university presses' lack of interest in pursuing digital publishing even though today's production of print monographs must be in digital format. Therefore, research libraries are beginning to experiment with digital presses such as the University of Tennessee's Newfound Press. The Newfound Press, the University Libraries digital imprint, advances the community of learning by experimenting with effective and open systems of scholarly communication. Drawing on the resources that the university has invested



in digital library development, Newfound Press collaborates with authors and researchers to bring new forms of publication to an expanding scholarly universe. Manuscripts in all disciplines, encompassing scientific research, humanistic scholarship, and artistic creation are considered through a collaborative peer review process.

Collaborative Learning, Teaching, and Research Spaces

The current wave of library transformations and collaborative commons area development is based on a number of factors. Our highly networked, digital, hyper technological environment combined with the emergence of born digital people, our students and younger faculty, set the stage. The digital revolution in its broadest sense is the primary driver. Students, in particular, have embraced the digital world, socially and intellectually. They have radically different ways of interacting, seeking and processing information. They have special interests and skills in social computing and collaboration. Libraries are developing and purchasing digital collections, databases, and services to help people access digital resources and at least try to be in the same digital if not physical spaces as our users.

Library physical spaces, built for legacy print collections, are ripe for transformation. College and university case-based curriculum require more team work. Spaces, hardware, software, and networking to achieve these group assignments are in demand. New standards of accountability demand that we, as educators, ensure use of our expensive collections and services, in ways that specifically advance intellectual, cultural, and social development of students and the process of creating knowledge for all users. We are unable to achieve relevance unless we are in the space. Thus, students or faculty should be co-creators of new spaces to ensure relevance and usability. Specific environmental factors illustrating the imperative to change and transform as noted by Lippincott (2005) include:

- ◆ the changing nature of libraries and the need to repurpose spaces built for the print era
- ◆ student and faculty reliance on digital scholarship and its supporting technology
- ◆ the need to create effective learning spaces and services for net gen students
- ◆ attracting and retaining the best and brightest students who have choices
- ◆ the desire to access, “remix,” and share digital resources and rich media in new ways
- ◆ addressing the imperative for “always on” 24/7 services, collections, and environments



Planning for new spaces should be accomplished within the context of addressing the different needs of our user communities – undergraduates, graduate students, and faculty. Collaborative planning is the key to success.

Creating spaces for advancing intellectual, social, and cultural development in the digital era includes exploring new possibilities for virtual spaces. We are in the process of developing a robust virtual Commons at the University of Tennessee. Other universities such as Vassar, University of Michigan, and Washington University have developed virtual collaboration spaces including for faculty. University of Minnesota and North Carolina State University libraries feature integrated social communication spaces as part of their services.

Extending the collaboration concept to the rest of the campus advances universities' goals of integrating expertise, technology, and environments needed to support teaching, learning, and the creation of new knowledge. The process of collaboration further underscores student and faculty-centered strategies for immersing the campus in digital scholarship, 21st century communication options, and richer interdisciplinary collaborations. Extending collaboration into new publishing models pushes out scholarly to the world reaching new audiences and, in turn, inspiring the creation of new knowledge to advance the human condition. Integration of social networking with collaborative, user-based decision making will further increase global intellectual growth and development.

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