Information Technology Trends and the Academic Research Library

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Information Technology

• Implementation should be coupled with understanding of both the informational needs and the tacit rules of the community.

Example: The Worm Community System (WCS) was designed for biologists studying C. Elegans. This prototype networked system functioned within the specified parameters, however there were problems that occurred due to the implementation being on a platform that was not commonly used by the community, and that the information was shared in a way that did not take into account the way the Community of Practice functioned (Star and Ruhleder 1994). (I worked for the designer when I was with the Digital Library Initiative, the analysis above was authored by a member of my doctoral committee who is a founding member of Social Informatics).

• Prediction of future physical instantiations is difficult.

Example: When I first took graduate programming courses, one of my texts predicted that "someday there will be a card reader on every desktop". The concept of mass storage remains, the physical instantiation changes constantly. Without dismissing the problem of digital preservation, planning focus should be on processes rather than physical instantiations.

• It is imperative to be open to possibilities provided by emerging technology.

Example: When Carlson invented the photocopier, everyone acknowledged that the device functioned, but it was rejected by IBM, Kodak, RCA, and A. B. Dick because they could not understand why anyone would want this device in an office environment (Brown and Duguid 1991). Something similar happened when the Swiss watchmakers were approached with digital technology.

• Historically, computing power has become more and more distributed.

Information collections follow this distribution:
As information technology becomes more distributed, increased awareness of user practices is essential for effective design. This area of study is called Social Informatics (SI) and is my doctoral specialty (for an introduction to SI, see (Kling, Rosenbaum and Hert 1998), (Kling 1998), (Bowker 1997), (Bishop and Star 1996)).
Example: When I was an undergraduate, I would take my electronic search material to the reference desk, and give it to a Librarian. They would perform the search and hand me a printout. Now users are building their own collections from many sources; understanding how they use and share information is critical to successful information technology implementation.

Academic Research Libraries

Boundaries are changing. The library used to be a building that you went to, now it is a service organization that can reach to the departmental server, individual desktop (and beyond). My observations are that undergraduates no longer want to go to the library, they want it all online. This can lead to tension between use and policy.
Example: For years librarians at various institutions have been trying to get Ethernet connections in university libraries and in dormitory rooms. When we succeeded in providing students with high speed access to digital education, they began e-mailing huge attached files and listening to streaming audio (and now DVD), resulting in a large unanticipated load on the network. The response in some cases has been user education, in others, restriction of services.

Specific Services

Remote Education

Remote education is becoming more and more pervasive. At the University of Illinois Instructional Technologies office, we offer hardware access, software support, and studio facilities for online education. At the Engineering Library where I worked for the DLI, we funded a state-of-the-art digital imaging laboratory that will be available for general use.

Personalization of the Path to Information

In 1945, Vannevar Bush, Director of the Office of Scientific Research and Development wrote:

> The real heart of the matter of selection … goes deeper than a lag in the adoption of mechanisms by libraries, or a lack of development of devices for their use. Our ineptitude in getting at the record is largely caused by the artificiality of systems of indexing. When data of any sort are placed in storage, they are filed alphabetically or numerically, and information is found (when it is) by tracing it down from subclass to subclass. It can be in only one place, unless duplicates are used; one has to have rules as to which path will locate it, and the rules are cumbersome. Having found one item, moreover, one has to emerge from the system and re-enter on a new path (italics mine). (“As We May Think” Atlantic Monthly 176/1 (1945): 101-108.)

The ability to customize, access, organize and deliver personal document collections is an emerging information technology that must be addressed by the academic research library.

One of the testbed systems at our department is the Community Architecture for Network Information Systems (CANIS), part of which searches multiple online journals (it is IP filtered so a partial screen is shown below).
Other work being done in this area includes Z39.50 translation and multiple database searches by the National Center for Supercomputing Applications (NCSA, at UIUC). The CANIS group also does latent semantic indexing which is an Artificial Intelligence (AI) attempt to derive the meaning of terms by their use in full text so that terms having different meanings in different groups are taken into account when searching. These methods are "not ready for prime time" but awareness of research in this area can assist in planning as the information technology matures. An example of some of the personal document collection management possibilities are shown by an example search using the Pagis search engine.
As personal document management becomes more pervasive, an awareness of Communities of Practice becomes more important. Communities of Practice are currently thought of as one of the key mechanisms that support knowledge work and information exchange in many environments (Cook and Brown 1999), (Topper 1995), (Stewart 1996), (Stamp 1999), (Sharp 1997), (Murray 1997), (McMaster 1999), (Brown and Gray 1995).

Remote Data Sources

As shown by the chart below, reliance on remote sources has been steadily increasing.

Consortial arrangements can be advantageous, and cooperative models exist which are endorsed by a growing body of library organizations. (Consortia 1999a; Consortia 1999b).
References


