Expanding Library Services in the Digital Age: The Search for [Almost] Equilibrium

Gary Marchionini

School of Information and Library Science, UNC-Chapel Hill

march@ils.unc.edu   www.ils.unc.edu/~march

DLF Forum on Digital Library Practices

Washington, DC

July 17-18, 1999

Outline

- Technology in context
- Change
- Complexity
- Variety
- DLs as extensions of PLs
- New augmentations

Gary Marchionini, UNC-CH

Technology in Context

- Technology demands attention (e.g., Moore's Law).
- Hype can hurt when resources are limited.
- People first, content second, technology third.
- The Internet is more about communication than information.

Focus on people.

Gary Marchionini, UNC-CH

Digital Library Design Space

Community

Technology

Services

Content

Gary Marchionini, UNC-CH
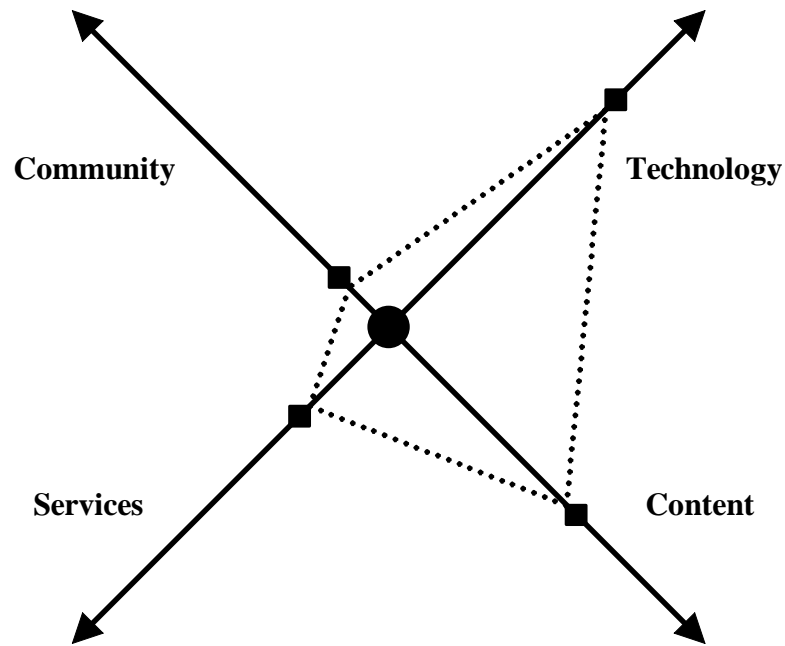
Technology Requirements

- Infrastructure
  - high-speed networks, mass storage, CPUs
  - ubiquitous access (home, car, office)

- Access
  - indexing and search
  - overviews and previews

- Interfaces
  - GUI (graphical user interface)
  - multiple modes, mobile

- Software engineering
  - rapid prototyping, iterative design
  - interoperability and federated architectures

Change

- Today's IT change is not unprecedented.
- People are energy and time conscious.
- Technology changes quickly, people and institutions change slowly.

Attend to organizational change

Storage

3000 BC   **Clay Tablets**   **1 character/cubic inch (cci)**

1450 AD   **Printed Page**   **500 cci**

1990's   **Optical Disc**   **125,000,000,000 cci**

Today: 1000 300-page books on CD-ROM

Gary Marchionini, UNC-CH

Computation

5000 BC	**Abacus**	**2-4 instructions per second (ips)**
1945 AD	**Computer**	**100's ips**
1960's	**Computer**	**100,000's ips**
1970's	**Computer**	**1,000,000's ips (MFLOPS)**
1980's	**Computer**	**10,000,000's ips**
1990's	**Computer**	**1,000,000,000's ips (GFLOPS)**

Transmission of Information

4000 BC	Messenger	.01 words per minute (wpm)
1844 AD	Telegraph	50-60 wpm
1980's	Cable/Fiber	1,000,000,000 wpm (GBPS)
1990's	Fiber	100,000,000,000 wpm

"Within a decade or so we will be able to send all human knowledge past your house in a few seconds".

Eric Sumner, 1990 (President IEEE)

Gary Marchionini, UNC-CH

Human Processing

4000 BC	Written Language	300 words per minute (wpm)
Today	Written Language	300 wpm
4000 BC	Visual Images	100,000,000 "bits per glance"
Today	Visual Images	100,000,000 "bits per glance"
4000 BC	Spoken Language	120 wpm
Today	Spoken Language	120 wpm

Gary Marchionini, UNC-CH

Fundamental IS Concepts

- Appraisal

- Relevance

- Authorship

- Document

- Classification

- Diffusion/publication

- Information needs

- Search process (strategies)

* Reuse/sharing

* Representation and data structure

* Design (both representation and mechanisms)

Gary Marchionini, UNC-CH

Key Library Functions

- **Collection Development**

- **Preservation**

- **Access**
  - cataloging
  - reference

- **Manage**
  - processes
  - resources

There are PEOPLE in digital libraries.

Gary Marchionini, UNC-CH

Complexity

- Human systems (including libraries) are inherently complex.

- "Perhaps networks just at the phase transition, just poised between order and chaos, are best able to carry out ordered yet flexible behaviors." Kauffman, p. 90.

- The surprises in complex systems are not predictable.

Pay attention, be flexible, collaborate, trust human behavior-- Humans are good at adaptation; pattern matching.

Gary Marchionini, UNC-CH

Variety

- On the edge of chaos?
  - High variety
    - Hyperpersonalization
    - Universal access
  - Standardization
    - efficiencies of scale
    - classification aims to reduce variety
- *H: The closer to basic infrastructure, the better the opportunity for reduced variety; the closer to the individual, the better the opportunity for increased variety.*Gary Marchionini, UNC-CH

Compare

- **Wall Mart** ⟶
  - wide product range
  - wide audience
  - high volume
  - price and efficiency
- **Travel Agent** ⟶
  - wide product range
  - narrow audience
  - low volume
  - service

- **Nordstrom**
  - specialized product range
  - narrow audience
  - lower volume
  - service, atmosphere
- **Travelocity**
  - narrow product range
  - broader audience
  - high volume
  - price, convenience

Compare

Local Bookstore	Borders	Amazon
Narrow product range	Wider product range	Widest product range
Narrow audience	Wider audience	Widest audience
Low volume	Higher volume	Highest volume
Service, atmosphere, convenience	Price, atmosphere	Convenience, price, recommendations

Gary Marchionini, UNC-CH

Compare

- <u>Research Library</u>
  - Wide product range (comprehensive)
  - Narrow audience (geo-bound)
  - High volume
  - Reference Service (but not 24/7), depth

- <u>Digital Library</u>
  - Narrow product range (so far)
  - Broad audience? (global)
  - High volume
  - convenience (24/7)

Evolution and Extinction

- Horse and buggy vs automobile
- automobile + airplane
- Radio + TV
- Newspapers + Broadcast news

Hypothesis: Services and Information are additive.

Gary Marchionini, UNC-CH

DL extensions

- DLs support broader, faster access
- DLs leverage automated backend processing
- New wine in old bottles
  - brokering expertise
  - validate/select quality
  - preservation (e.g., public keys as well as works)
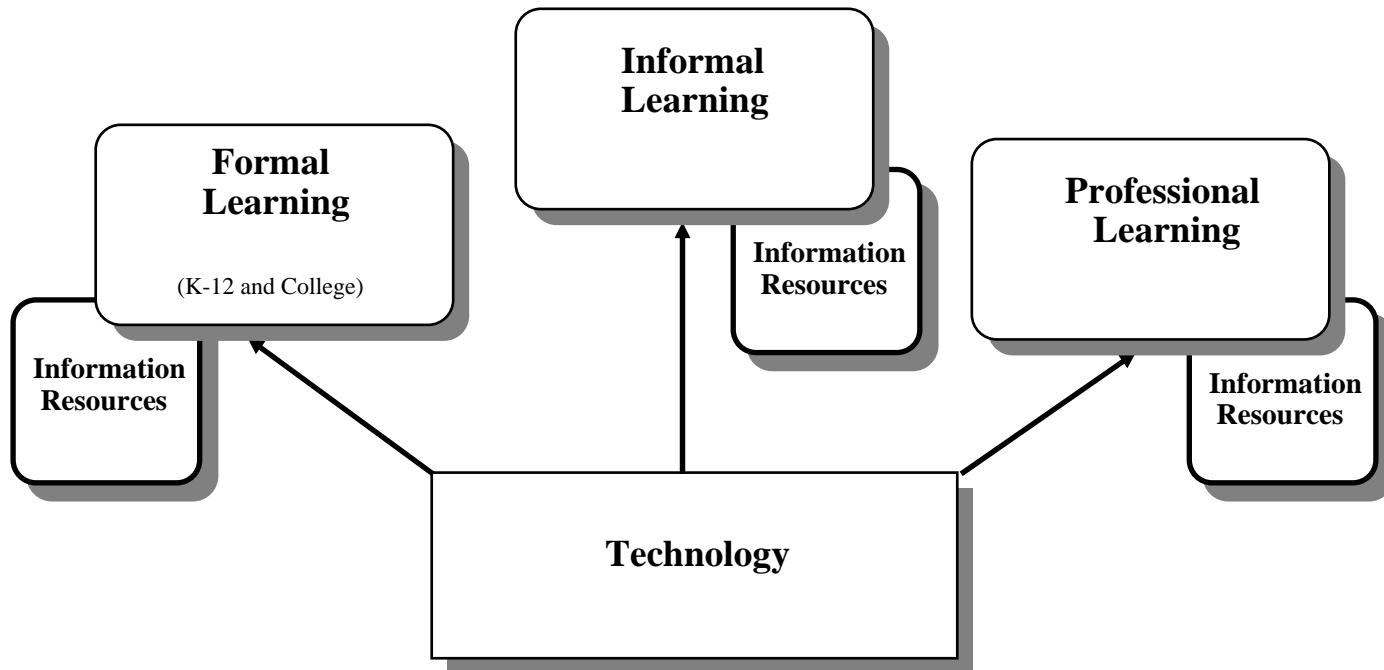 - configuration management

Library Augmentations

- New types of reuse and sharing
- Patron Contributions
- Virtual communities and collaboratories
- Direct support for creation and use (entire information life cycle)
- Collaborative filtering, cataloging, question answering
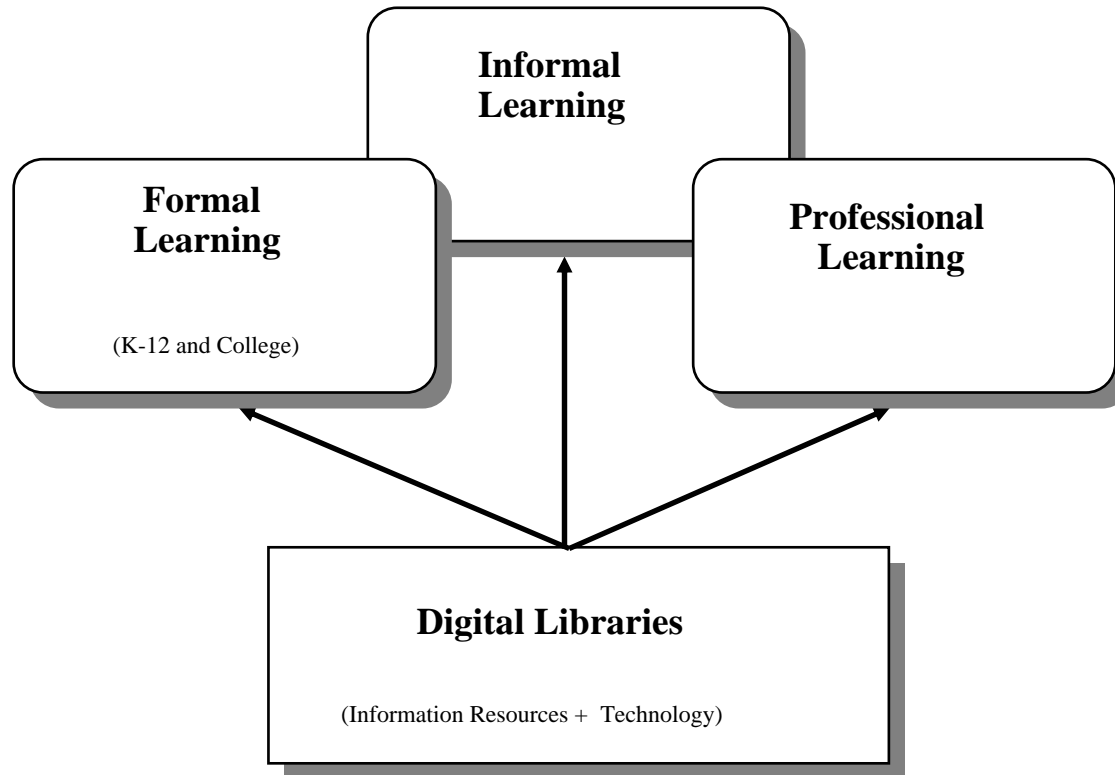- Open-source libraries

Sharium

- A virtual workspace with rich content and powerful tools where people can work independently or collaborate with each other to learn and solve information problems. A collaborative problem solving environment.
  - Organized around resources and tools
  - Encourages contributions and participation
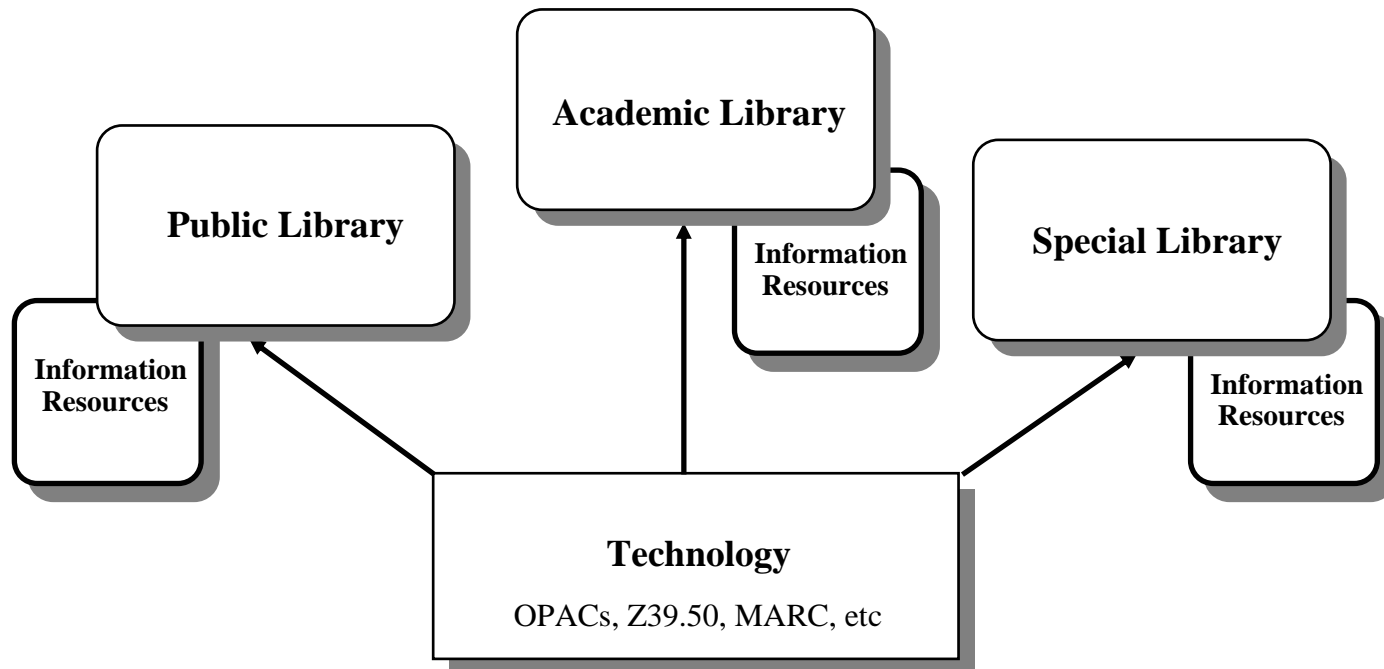 - Is sustainable

Current model of technological support for types of learning

Gary Marchionini, UNC-CH
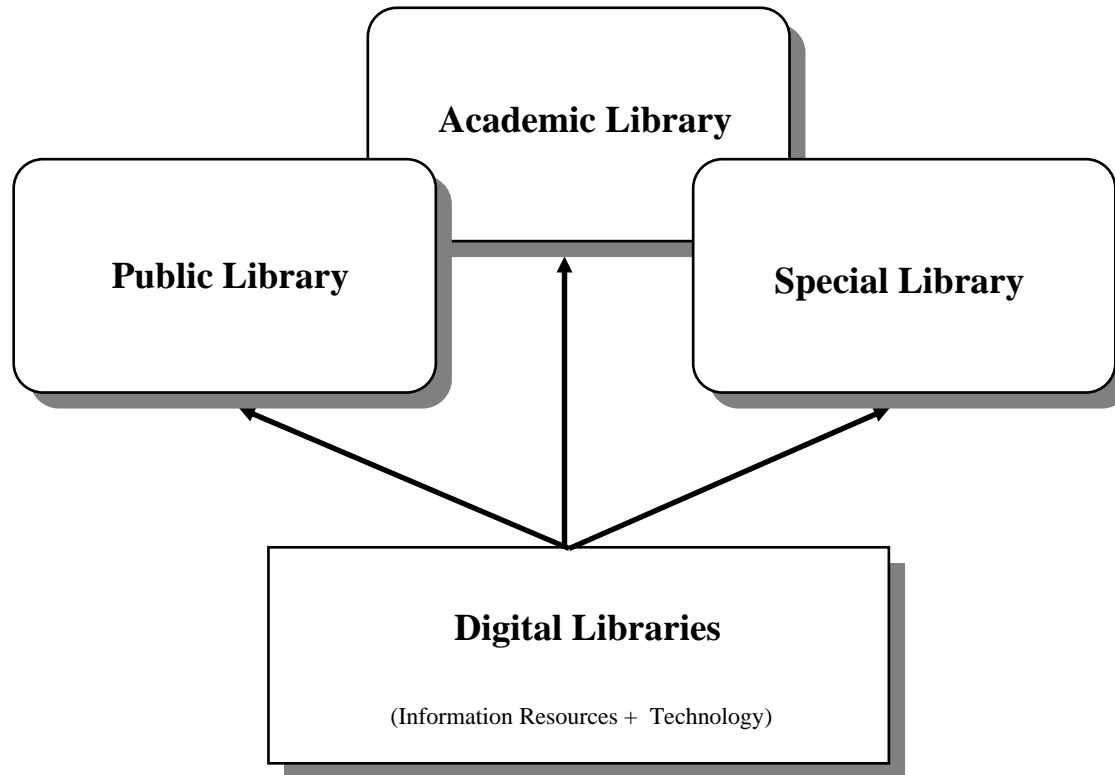
Digital libraries lead to integrated resources and types of learning

Informal Learning

Formal Learning

(K-12 and College)

Professional Learning

Digital Libraries

(Information Resources + Technology)

Gary Marchionini, UNC-CH

Current model of technological support for types of libraries

Academic Library

Public Library

Special Library

Information Resources

Information Resources

Information Resources

Technology

OPACs, Z39.50, MARC, etc

Gary Marchionini, UNC-CH

Shared Digital Libraries Lead to Integrated Resources and Services (Federation)

Academic Library

Public Library

Special Library

Digital Libraries

(Information Resources + Technology)

Gary Marchionini, UNC-CH

Summary

- Focus on people.

- Broaden services to all aspects of information life cycle.

- Coordinate physical and digital library resources AND inform users.

- Standardize on infrastructure and customize on client support and service.

- Be flexible and look for new augmentations.

Gary Marchionini, UNC-CH

Personal Pointers

Marchionini, G. & Fox, E. (1999). Progress toward digital libraries: Augmentation through integration (Guest Editors' Introduction). *Information Processing & Management.* 219-225.

Marchionini, G., Plaisant, C., & Komlodi, A. (1998). Interfaces and tools for the Library of Congress National Digital Library Program. *Information Processing & Management,*34(5), 535-555.

Fox, E. & Marchionini, G. (1998). Toward a worldwide digital library. *Communications of the ACM*, 41(4).

Marchionini, G., & Mauer, H. (1995) The roles of digital libraries in teaching and learning, *CACM*, 38(4), 67-75.

Marchionini, G. (1995) *Information seeking in electronic environments*. Cambridge U. Press.

Marchionini, G. (1998). Digital Library Research and Development. In A. Kent (Ed.) *Encyclopedia of Library and Information Science*. Vol 63, Supplement 26. NY:Marcel Dekker. 259-279.

Marchionini, G. (in press). The Information Specialist as Fulcrum. In A. Scammell (Ed.) *Visions of the Information Future*. London: Aslib

Marchionini. G. Consider a Sharium. http://ils.unc.edu/~march/sharium/sharium1.1.html

Gary Marchionini, UNC-CH