Benchmarking for Building

Future Engineering & Science Libraries

MITLibraries

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Future Engineering and Science Libraries

The April 2003 MIT Engineering and Science Library Benchmarking Study

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Outline:

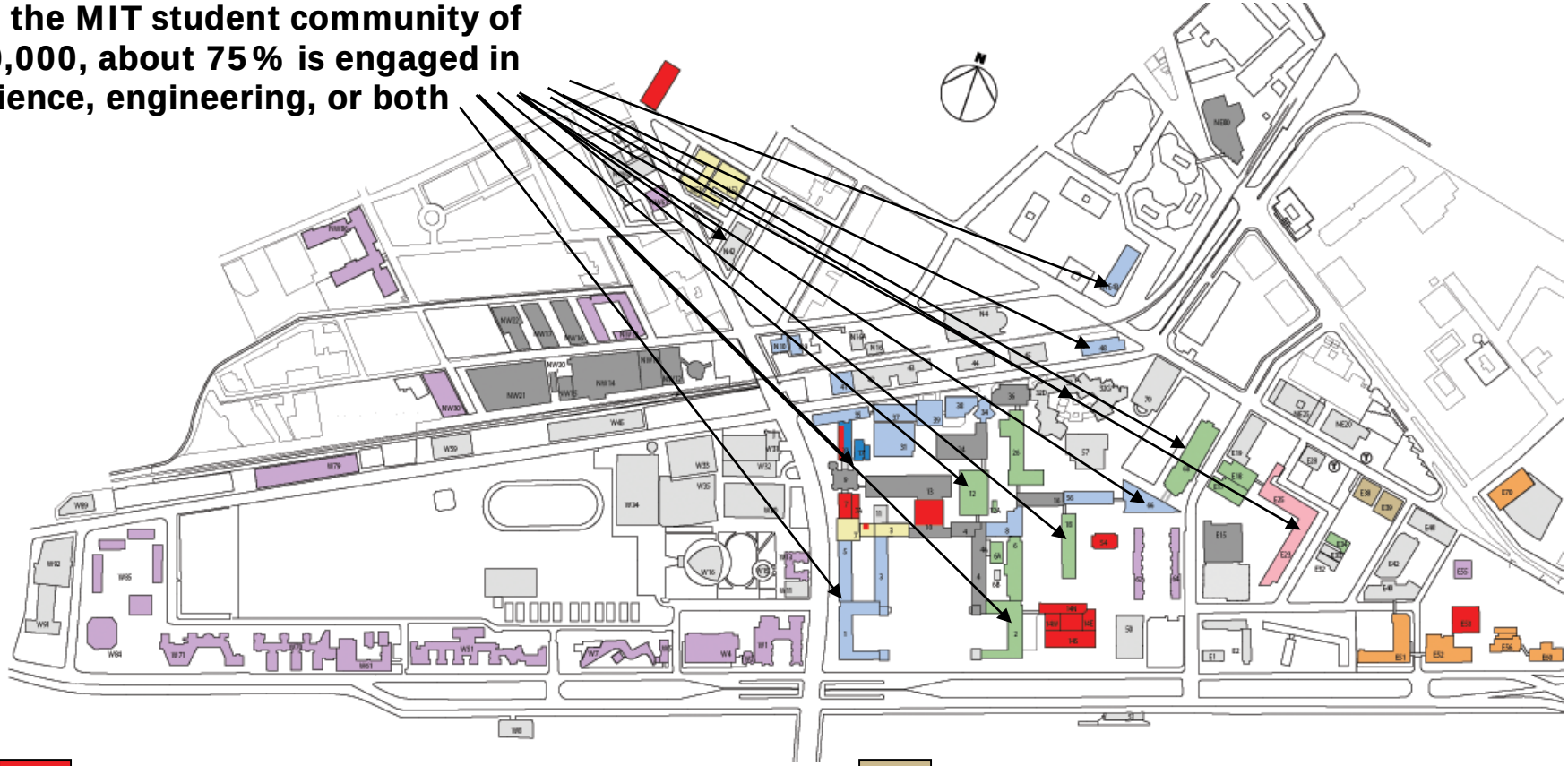
1. The MIT environment and our challenge
2. Benchmarking: why, how
3. MIT's building benchmark process and findings
4. Problems, limitations, lessons learned

Additional material available via website or from annagold@mit.edu

- Resources on benchmarking library buildings
- Detailed results from MIT benchmarking

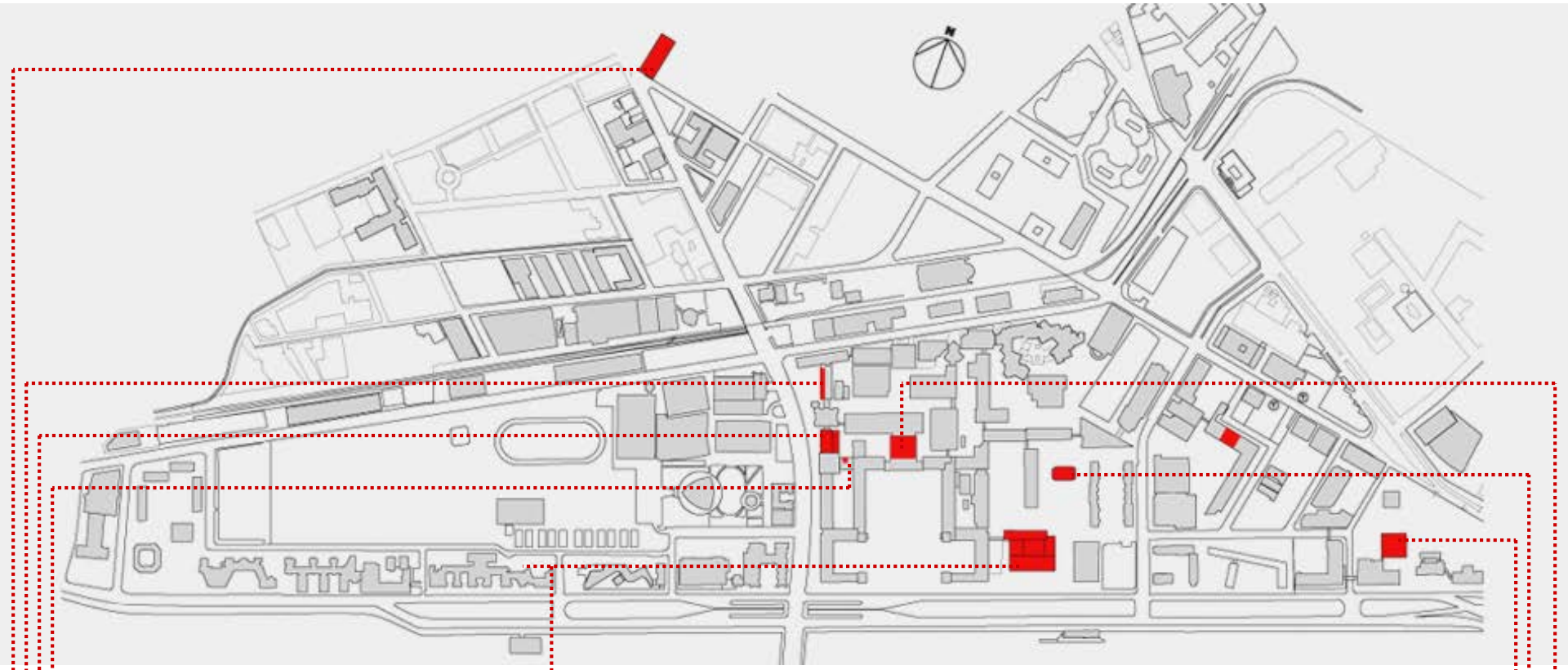
1. MIT environment

Of the MIT student community of 10,000, about 75% is engaged in science, engineering, or both



- Library
- School of Engineering (not include Department of Aero/Astro)
- Department of Aeronautics and Astronautics
- School of Science
- School of Architecture and Planning
- School of Humanities, Arts, and Social Sciences
- Whitaker College of Health Sciences and Technology
- Sloan School of Management
- Multidiscipline Use
- Residential

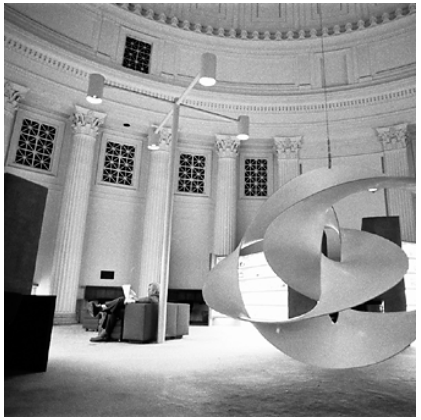
1. MIT environment - MIT libraries



- Rotch Visual Collections
- Rotch Library
- **Aero/Astro Library**
- **Retrospective Collection**
- **Science Library**
- Humanities Library
- Music Library
- **Administrative Offices | Office of the Director**
- **Document Services**
- **Institute Archives and Special Collections**
- Dewey Library
- **Lindgren Library**
- **Barker Library**

1. MIT environment – MIT Engineering and Science Libraries

Barker Library

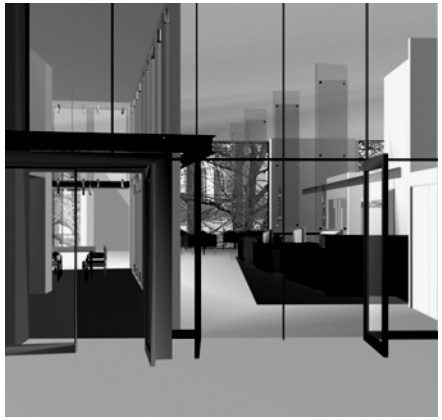


Opened in 1916
***Recent major renovation**: 1970*
***Total Area**: 25,573 sf*

Subjects
Engineering (not incl. Aerospace)

Collection
95,668 vol. Monographs
(+38,890 vol.in offsite storage)
3,030 active serials
89,720 vol. Bound serials
(+98,975 vol.in storage)
22,473 theses
55,754 technical reports

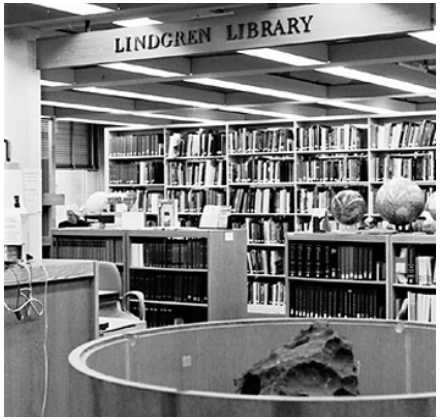
Science Library



Opened in 1951
***Recent renovation (entry and compact storage):** 2002*
***Total area:** approx. 33,000 sf*

Subjects
Science, Neurosciences
Collection
33,020 volumes monographs
(+ 131,637 vol. in offsite storage)
3902 active serials
224,963 vol. bound serials (+
31,776 vol. in offsite storage)
3575 vol. theses
53,849 vol. technical reports
77,842 cartographic items

Lindgren Library



Opened in 1964
***Total area:** 4,728 sf.*

Subjects
Earth, Atmosphere & Planetary Sciences

Collection
20,471 vol. monographs
(+ 1598 vol. in offsite storage)
1256 active serials
29,182 vol. bound serials
(+ 16,647 in offsite storage)
770 vol. theses
1208 vol. technical reports
11,357 cartographic items

Aero / Astro Library

Renovated in 2001
***Total area:** ~1200 sf*

Subjects
Aeronautics and Astronautics

Collection
6306 vol. monographs
492 active serials
36,164 vol. bound journals
(31,656 offsite)
6508 theses
50,650 technical reports

1. MIT environment - the decision to build a combined library

- ***1996 – 1998:*** MIT Task Force on Student Life and Learning.

- ***1997-1998:*** Report on MIT Libraries Space Needs.

- ***2000:*** Administrative merger of Engineering, Science, plus three branch libraries.

- ***2002:*** Faculty issue report calling for the construction of a new combined Science and Engineering Library.

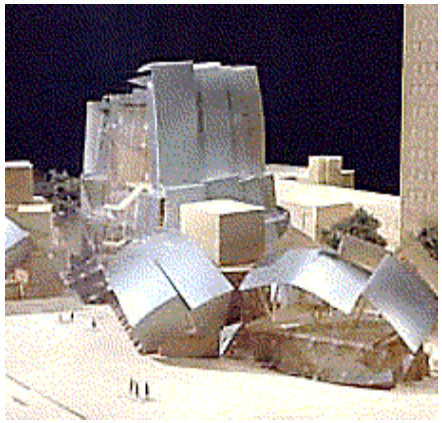
- ***2002-2003:*** Steering Committee charges Working Group to conduct Planning Study.

- ***2003:*** Began Benchmarking Project.

2: Benchmarking – what it is

- Comparison against *partner organizations* to determine best practices.

- "Friendly competitive intelligence"



2. Benchmarking – general methods

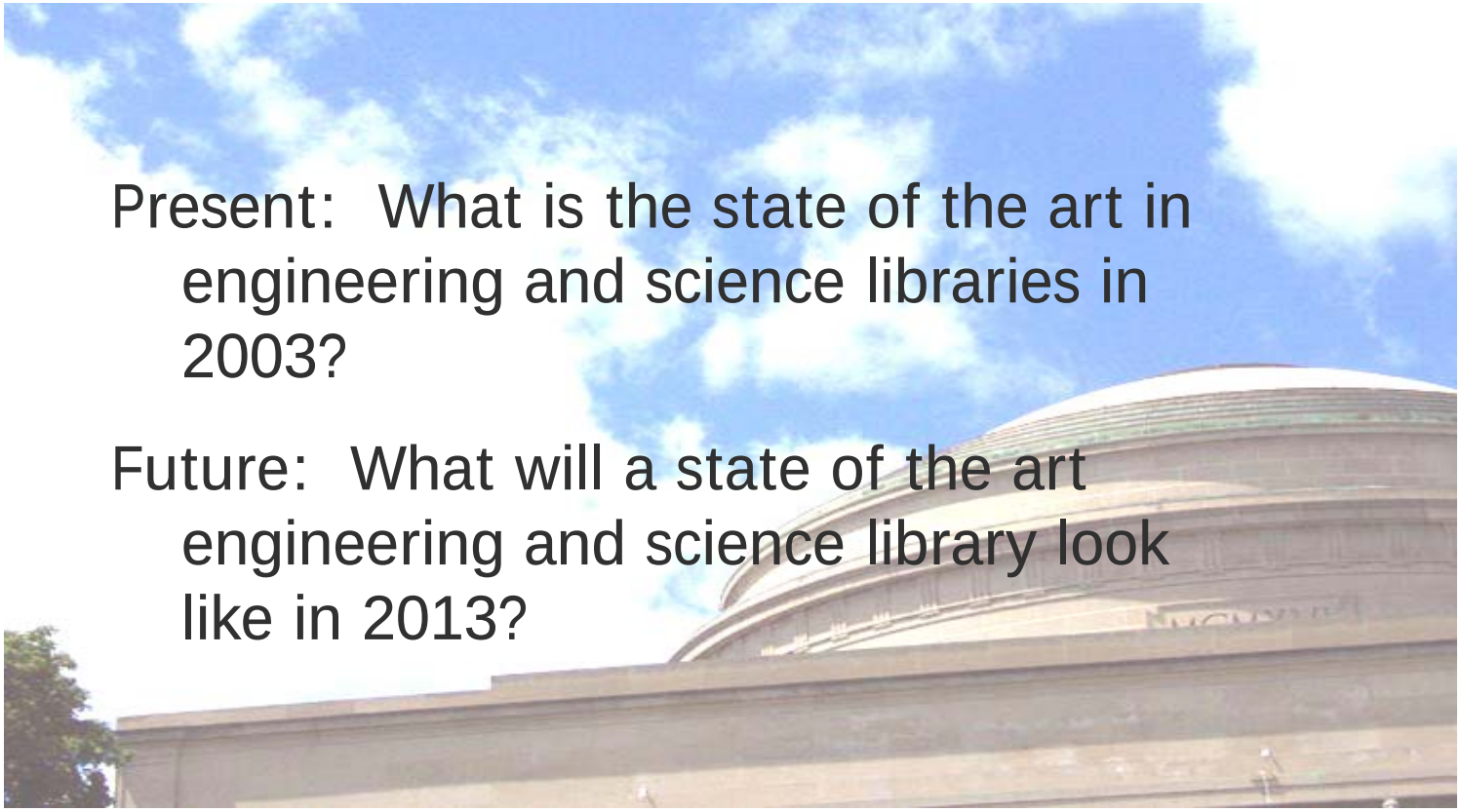
- Identify partners / peers
- Select 5-7 metrics: avoid the pitfall of too much (meaningless) data
- Consider gathering both quantitative and qualitative data

2. Benchmarking – why important at MIT

- MIT decision-makers expect data before making decisions

- A better outcome:
  - Meet end-user requirements more effectively
  - Reflect external conditions more accurately
  - Identify best practices

2. Benchmarking – our goal – to answer two questions



Present: What is the state of the art in engineering and science libraries in 2003?

Future: What will a state of the art engineering and science library look like in 2013?

3. MIT's project – began by identifying peers / partners:

The "SHYMP" group:

- Stanford
- Harvard
- Yale
- MIT
- Princeton

Plus: Caltech, Columbia, Cornell, UCB, UIUC

3. MIT's project – survey phase (present)

Excel spreadsheets sent to target libraries:

- **"Baseline" questions about collections, user seating, facilities, services**
- **"Trends" questions about** services and collections
- **Narrative** responses were also invited

Responses were received from most targets but were very uneven and incomplete both across and within target institutions.

3. MIT's project – survey findings – five themes

- Consolidation and renovation of facilities
- Collections storage strategies
- Electronic / print acquisition trends
- User space / seats per user
- New user facilities

3. MIT's project – survey findings – consolidation and renovation of facilities

There is a trend towards consolidation of libraries, including branch closing, major renovation, and new building

Caltech: *Fairchild library, built in 1997, has consolidated collections of* ***seven*** *libraries (science and engineering)*

Columbia: *Plan to consolidate* ***six*** *science and engineering libraries (science and engineering) by 2010*

Cornell: *Mann Library began a* ***major renovation****, November 2003*

Princeton: ***Engineering*** *library built 2001.* ***Four*** *science libraries to be consolidated in one, groundbreaking 2004*

Stanford: *Two major consolidation projects underway, each uniting* ***three*** *libraries, by 2010*

3. MIT's project – survey findings – collection storage strategies

Tiered access strategies (on-site, compact, and off-site) are the rule, with major holdings on-site.

Cornell: *On-site storage ranges from* ***68% to 80% to 100%***

Princeton: *On-site storage ranges from* ***65% to 100%, local high-density storage facility****, only 2% in off-campus storage*

UIUC: 100% *of collections are on-site*

Yale: *Plans for only* ***high-use materials on site*** *in 10 years*

MIT: *On-site storage is currently at* ***59%***

3. MIT's project – survey findings – electronic / print acquisitions

- *Print periodical acquisitions show trend toward moderate decreases.*
- *The rate of acquisition of electronic periodicals has been increasing in the past five years.*
- *Book acquisition has remained stable.*
- *Move to electronic-only is slow at several peer libraries due to archiving concerns (Yale, Harvard).*

3. MIT's project – survey findings – user space / seats per user

Most MIT peers seat a smaller percentage than the ACRL standard (25%) but more than MIT:

Percent users seated:

- *Yale: 27%*
- *UIUC: 15%*
- *Stanford: 13%*
- *MIT: 5.4%*

3. MIT's project – survey findings – new user facilities

Most MIT peers offer an array of new types of user facilities, from expansive informal learning areas, to group study, media production, GIS, 24-hour, café, lecture, meeting, and teaching areas.

EXAMPLES:

Caltech: *Digital Media Center (media production center)*

Cornell: *facility for digital media production; Café in library*

Princeton: *plans for café and open public spaces in new Science Library, adjacent to Digital Map and Geospatial Information Center*

UIUC: *reading rooms double as social event space, numerous group study rooms are heavily used*

3. MIT's project – Ideas Workshop phase (future)

Creating a State of the Art Engineering & Science Library

April 1 2003 Ideas Workshop Participants:

Cornell University: John Saylor, Director of the Engineering and Computer Science Library, and Director for Collection Development, NSDL

Dartmouth College: Malcolm Brown, Director of Academic Computing

Drexel University: Carol Montgomery, Dean of Libraries

MIT: Phil Long, Senior Strategist, Academic Computing Enterprise, plus members of the MIT Working Group

University of Illinois, Champaign-Urbana: Bill Mischo, Director, Grainger Engineering Library

Yale: David Stern, Director of Science Libraries and Information Services

3. MIT's project – Ideas Workshop questions

1.Research:

- How will the needs of individual disciplines differ (or not) in the future?

2.Scholarly Communication:

- How will the publication of research change in the future?

3.Pedagogy:

- What shifts in pedagogy will impact the role of engineering and science libraries ten years out?

4.Community:

- What is the future role of the library in supporting community?

3. MIT's project – analysis of trends - Ideas Workshop -questions

5.Collections:

- How will print and digital resources grow over the next 15 years? Will this vary by discipline? How can digital and print be integrated?

6. Services:

- What role will the library play in supporting new media, simulation, visualization, or other emerging activities?

7. Staff/Organization:

- With whom should libraries be collaborating? How will staff roles and services change, and how will staff interact with users?

8. Space:

- How will user spaces change? What should they be like in the future?

3. MIT's project – analysis of trends - Ideas Workshop - summary

- New demands are being placed on library facilities and services, by
  - ***interdisciplinary scholarship,***
  - demand for ***richly supported informal learning environments,***
  - a growing role for ***interactive computational tools and interfaces,*** and by
  - the ***heightened complexity of the information environment.***

- These and related pressures are also driving libraries to find ***greater efficiencies in staffing and infrastructure.***

4. Problems, lessons learned -

- No existing combined science and engineering libraries among our benchmarks
- Number of measures and dimensions was cumbersome and yielded a great deal of partial data of little use
- Search for best practices suggested a range of options, not optimal choices
- Much data we sought was not readily available from peers

4. Problems, lessons learned –

How could we have improved the outcome?

- Reduced data points
- Chosen other peers for survey, e.g. research universities with combined science / engineering libraries
- Created more mutual ownership of process among identified peers?

4. Problems, lessons learned – was it worth doing?

Yes – we have expanded our documented knowledge of what *institutional* peers are doing.

But –

- better baseline data would be more useful and
- we have no systematic data on best practices for particular building features (e.g. bioinformatics/GIS facilities, instructional spaces)

4. Problems, lessons learned –

Can we benchmark benchmarking? What are benchmarking practices in other library communities?

Medical Libraries: MLA Benchmarking Network – http://www.mlanet.org/members/benchmark/index.html

New South Wales public libraries – benchmarking for building

http://www.sl.nsw.gov.au/pls/policies/build/

Conclusion - benchmarking: not just for building

"benchmarking data can be a tool to help you improve resources and support decision-making."

"it's your umbrella for a rainy day; you never know when cuts loom and data can successfully defeat unreasonable cuts to staff, space or budget."

"…benchmarking data is an opportunity, a vast untapped apple tree; you never know what possibilities you may uncover when you browse the benchmarking data."

- http://www.nynjmla.org/benchmark2003.html

Benchmarking resources -

Benchmarking buildings:

1. Benchmarking library buildings: with benchmark spreadsheets, **http://www.sl.nsw.gov.au/pls/policies/build/**
2. Shill, Harold B. and Shawn Tonner, “Does the Building Still Matter,” College & Research Libraries, March 2004, v. 65 n. 2., pp 123-150.
3. Shill, Harold B., and Shawn Tonner, “Creating a Better Place, Physical Improvements in Academic Libraries, 1995-2002,” College & Research Libraries, November 2003, v. 64, pp. 431-466.
4. Planning the modern public library building. Libraries Unlimited, :2003.
5. Lied Library: multiple articles in Library Hi Tech, 2002: v. 20, n. 1.

Benchmarking resources -

General:

1. Benchmarking bibliography: Mignon S. Adams, Jeffrey A. Beck, comps. User Surveys in College Libraries. http://wilu2003.uwindsor.ca/ENGLISH/pres/JanGuise/WILUBibliographyfinal.htm, Library Assessment and Benchmarking Institute, 2002
2. Learning the skills needed to assess and benchmark (preview of the Library Assessment and Benchmarking Institute, September 2002, Monterey, California Journal Name:Information OutlookSource:Information Outlook v. 6 no. 7 (July 2002) p. 42)
3. Ahead or behind the curve...*Nikki Poling*. Information Outlook. Washington: Jul 2002. Vol. 6, Iss. 7; pg. 22, 4 pgs
4. Benchmarking in Information Centers / Libraries. SLA, 1/30/2004, http://www.sla.org/content/resources/infoportals/qa.cfm members-only
5. Benchmarking basics for librarians: http://www.sla.org/division/dmil/mlw97/gohlke/
6. Defining and measuring the library's impact on campuswide outcomes, College & research libraries [0010-0870] Lindauer, 1998 vol: 59 iss: 6 pg: 546.
7. General bibliography / guide on benchmarking: http://www.lib.washington.edu/business/guides/bench.html

Benchmarking resources -

Case studies:

1. Learning from Other Libraries: Benchmarking to Assess Library Performance: Deutsch, Paula; Silcox, Barbara P. Information Outlook v. 7 no. 7 (July 2003) p. 18-20, 22-5

2. The University of Virginia Library's Experiment with Benchmarking. Virginia libraries [1086-9751] White: 2002 vol: 48 iss: 4 pg: 17

3. Driving Change in the Profession: Subject Benchmarking in UK Library and Information Management. Libri [0024-2667] Huckle : 2002 vol: 52 iss: 4 pg: 209

4. Benchmarking Academic Business School Libraries Relative to Their Business School Rankings. Journal of business & finance librarianship [0896-3568] Page ll , 2002 vol: 7 iss: 4 pg: 3

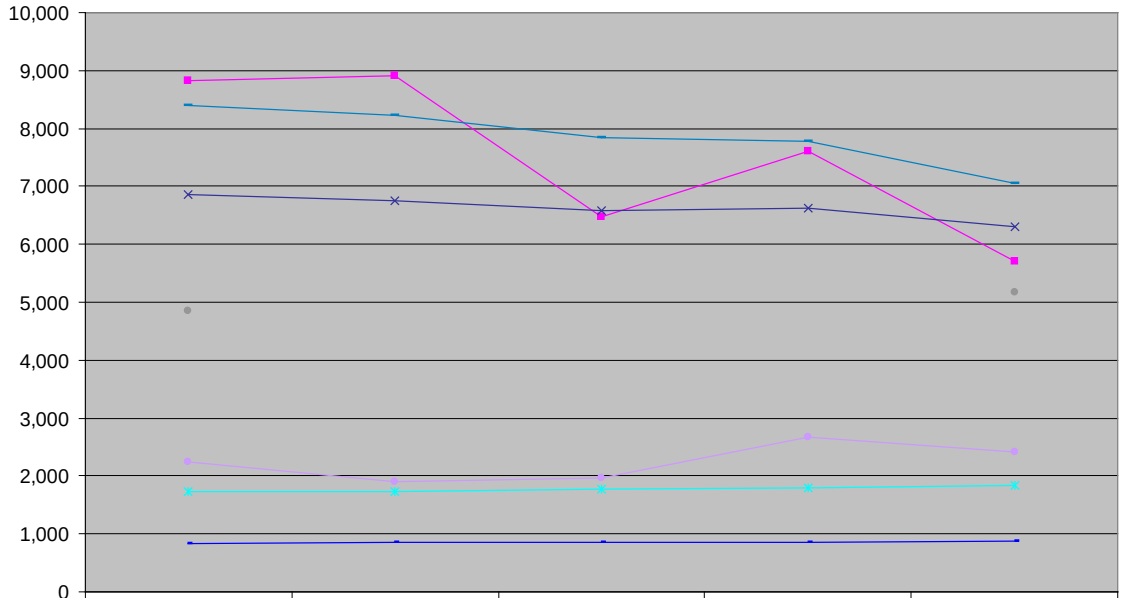
5. Building benchmarks to craft a better library future: Hennen's American public library rating index. Australasian public libraries and information services [1030-5033] Hennen , 1999 vol: 12 iss: 2 pg: 52

Variation among MIT's "peer" libraries (2002 ARL statistics):

Institution	Student FTE	Books	Serial titles	Library Expenditure per student	Books per student	Library staff per student	Gatecount
Caltech	1,889	.5M	3,500	$2922	305	10.3	3,350
Columbia	18,356	7.3M	49,988	$1874	396	10.1	N/A
Cornell	12,020	5.5M	48,241	$2268	459	13.2	N/A
Harvard	19,950	14.4M	190,528	$4053	724	24.3	N/A
MIT	**9,797**	**2.6M**	**20,207**	**$1227**	**266**	**8.7**	**18,839**
Princeton	6,362	5.3M	37,629	$4615	835	19.3	N/A
UC Berkeley	29,562	9.1M	78,891	$1300	308	7.0	N/A
UIUC	35,984	9.5M	90,962	$770	263	4.6	N/A
Yale	10,980	10.5M	55,606	$4303	956	20.9	N/A

MIT Benchmark Survey - RATE OF ACQUISITIONS | PRINT PERIODICALS

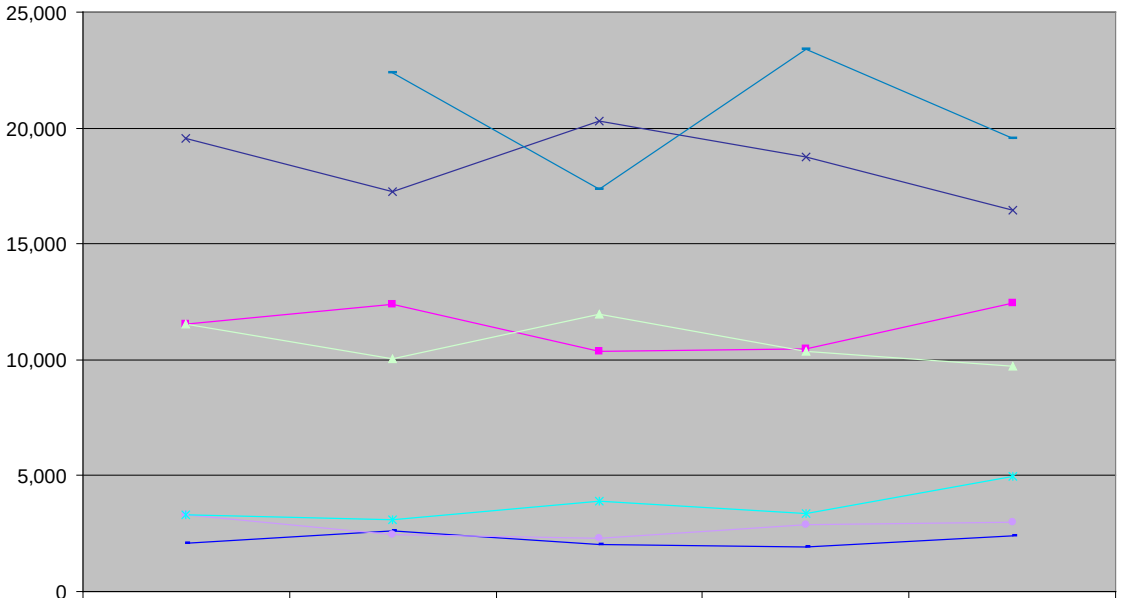
Trends | Rate of Acquisitions | Print Periodicals (Volumes)



	1998	1999	2000	2001	2002
MIT	8,820	8,919	6,478	7,606	5,703
Harvard	837	850	856	856	871
Princeton	2252	1912	1956	2664	2414
Yale	4847				5164
Stanford	6,859	6,752	6,588	6,616	6,310
UC Berkeley					
UIUC					
Cornell	8399	8227	7845	7783	7053
CalTech	1734	1738	1770	1786	1829
Columbia					

MIT Benchmark Survey - RATE OF ACQUISITIONS | MONOGRAPHS

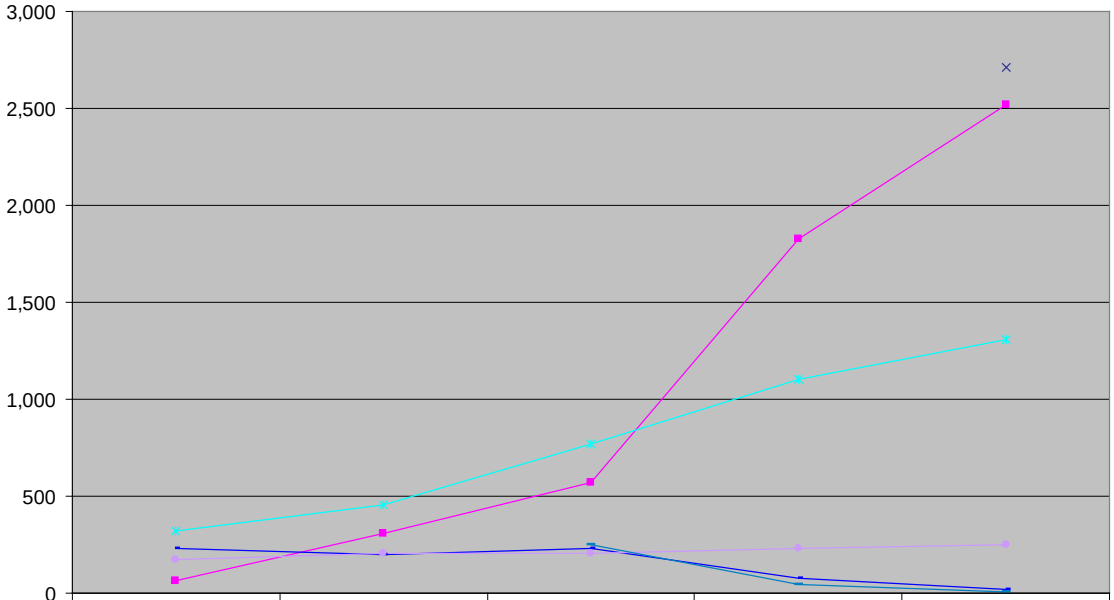
Trends | Rate of Acquisitions | Monographs (volumes)



	1998	1999	2000	2001	2002
MIT	11,557	12,408	10,355	10,482	12,433
Harvard	2,109	2,603	2,027	1,901	2,387
Princeton	3310	2453	2318	2911	2989
Yale					
Stanford	19,537	17,243	20,325	18,757	16,460
UC Berkeley					
UIUC					
Cornell		22,369	17,372	23,400	19,533
CalTech	3338	3093	3882	3356	4944
Columbia	11540	10047	11964	10386	9716

MIT Benchmark Survey - RATE OF ACQUISITIONS | ELECTRONIC PERIODICALS

Trends | Rate of Acquisitions | Electronic Periodicals (Subscriptions)



	1998	1999	2000	2001	2002
MIT	63	305	569	1,829	2,518
Harvard	229	201	230	79	22
Princeton	170	205	205	232	250
Yale					
Stanford					2,711
UC Berkeley					
UIUC					
Cornell			253	43	8
CalTech	321	454	770	1100	1309
Columbia					

Notes:

1. *Notes on MIT data can be found on previous page. Figures shown are for subscriptions.*

Ideas Workshop – Research Trends Summary

Q: How will the needs of individual disciplines differ (or not) in the future?

TRENDS:

- Blurred boundaries between sciences and engineering
- Growing impact of life sciences across all disciplines
- Increased use of historical literature
- Need for tools to expand search domain beyond immediate discipline
- Emphasis on collaborative work

Ideas Workshop – Research Trends Summary

Q: How will the needs of individual disciplines differ (or not) in the future?

IMPACTS ON BUILDING:

- Provide technology-enabled meeting spaces
- Combine or collocate disciplinary information collections and expertise across science and engineering
- Support collections, services, and facilities that encourage knowledge transfer between disciplines
- Provide ready access to both historical literature and “active archives”, whether digital or print

Ideas Workshop – Communication Summary

Q: How will the publication of research change in the future?

TRENDS:

- More self-publishing and non-commercial publishing is anticipated, e.g. in digital repositories and on the web
- Peer review will endure until tenure process changes, but will extend to materials in digital repositories
- Current commercial business models for distribution and archiving won't scale over the long term

Ideas Workshop – Communication Summary

Q: How will the publication of research change in the future?

IMPACTS ON BUILDINGS:

- Provide facilities that support the Libraries' role in building active, persistent institutional and personal open archive with peer review capabilities, and in ensuring wide dissemination of MIT research results
- Provide secure, archival conditions for managing and retrieving historic and current print collections
- Provide facilities to support a program for digital archiving of historic and born-digital scholarly resources

Ideas Workshop –Pedagogy Summary

Q: What shifts in pedagogy will impact the role of engineering and science libraries ten years out?

TRENDS:

- More emphasis on problem- and design-based learning
- More demand for presentation and communication skills
- Bigger role of research in undergraduate curriculum
- Ubiquitous use of course management systems
- More use of technology by teaching faculty, including wider array of media

Ideas Workshop –Pedagogy Summary

Q: What shifts in pedagogy will impact the role of engineering and science libraries ten years out?

IMPACTS ON BUILDINGS:

- Demand for new and specialized facilities: e.g. bioinformatics labs, group collaborative space, projection devices and whiteboards, collaborative software, flexible spaces
- 24x7 space (with heaviest use between 11 pm and 3 am)
- Zoned spaces (quiet, contemplative; noisy, interactive; individual; group)
- Collaborative curriculum development spaces

Ideas Workshop – Community Summary

Q: What is the future role of the library in supporting community?

TRENDS:

- Growing importance of informal learning in small clusters
- Open informal and neutral spaces can create critical informal learning commons
- Technology will support community interactions

Ideas Workshop – Community Summary

Q: What is the future role of the library in supporting community?

IMPACT ON BUILDINGS:

- Variety of flexible group spaces
- Cafe, “edutainment” spaces, capable of hosting small events (concerts, lectures, book signing)
- Virtual videoconferencing support
- Gathering space with video capture and digital archiving capabilities
- Variety of display and exhibit spaces
- Flexible spaces suitable as temporary project work spaces

Ideas Workshop – Collections Summary

Q: How will print and digital resources grow over the next 15 years? Will this vary by discipline? How can digital and print be integrated?

TRENDS:

- Archival responsibility for books and many journals will remain with libraries
- Book collections will continue to grow and browsing will remain desirable for books
- Reference book collections will shrink as data and reference tools migrate to online access
- Expectations will rise for rapid delivery and full-text searching of historic literature
- Need to bind print journals will decrease
- Data and media will play larger role in library collection responsibilities

Ideas Workshop – Collections Summary

Q: How will print and digital resources grow over the next 15 years? Will this vary by discipline? How can digital and print be integrated?

IMPACT ON BUILDINGS:

- High density storage of print journals will ensure rapid delivery, preservation, and allow for long-term collections growth
- Book collections are ideally shelved in open, browsing stacks
- Provide virtual spaces and physical places where print and new media can be used together and integrated into teaching or research
- Plan for environments or facilities where users can access and use a variety of media and data in the context of traditional print objects

Ideas Workshop – New Services Summary

Q: What role will the library play in supporting new media, simulation, visualization, or other emerging activities?

TRENDS:

- Personal virtual information spaces, managed by users
- Library will play role in mediating and assisting users, e.g., provide metadata consulting, advise on information management, teaching, lab instruction, instruction in use of digital tools, etc.
- Traditional and non-traditional teaching roles of librarians will increase
- Greater role of data and media, including spatial analysis, visualization and media production, in library collections, services, and use, e.g. in course production; this will also lead to a trend towards specialty degrees for librarians

Ideas Workshop – New Services Summary

Q: What role will the library play in supporting new media, simulation, visualization, or other emerging activities?

IMPACT ON BUILDINGS:

- Flexible spaces for collaboration, consulting, and experimentation will be key strategies
- Instructional spaces and collaborative settings will be needed to support the shift in focus of service from access to assistance
- Plan for facilities to handle access and manipulation of data, conversion, media production

Ideas Workshop –Organization and Staff Summary

Q: With whom should libraries be collaborating? How will staff roles and services change, and how will staff interact with users?

TRENDS:

- Integrated service points: reference/circulation/referral, some unstaffed service points
- IT support by library, increased technology staff
- Curriculum with library support
- Lower processing costs (fewer materials, shelf-ready books)
- Automated inventory (RFID)
- Customer-centered service models
- Mobile working lifestyles, work with users in their spaces
- Online communities and communications

Ideas Workshop –Organization and Staff Summary

Q: With whom should libraries be collaborating? How will staff roles and services change, and how will staff interact with users?

IMPACT ON BUILDINGS:

- Ensure flexibility of service points
- Increase space for technical support
- Plan for access to staff spaces by library users
- Ensure a mobile and distributed computing support
- Plan adequate staff space, with quiet work spaces and open lab-like environments to encourage clustering, interaction with library visitors, and team design and discussion

Ideas Workshop – User Spaces Summary

Q: How will user spaces change? What should they be like in the future?

TRENDS:

- 24-hour access for individual and group work
- Shared or adjacent spaces for teaching, career counseling, curriculum development
- Scholars' need for "away" spaces
- "Transparency" desirable
- Greater mobility of scholars
- Group spaces with flexible, movable partitions, furniture

Ideas Workshop – User Spaces Summary

Q: How will user spaces change? What should they be like in the future?

IMPACTS ON BUILDINGS:

- Differentiated facilities for faculty study, student group work, etc.
- Support for commuter and mobile scholar offices, etc.
- Ensure flexibility of group spaces: multiuser/multitasking rooms
- 24 hour access spaces
- Access by library partners (researchers, faculty)