

The Science Learning Network Project Overview

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This project is a collaborative effort to foster teacher professional development via high bandwidth (T1) telecomputing and inquiry-based science learning and teaching.

Begun in July of 1993 by the Franklin Institute Science Museum in Philadelphia, PA, and Unisys Corporation in Blue Bell, PA, the Science Learning Network (SLN) is continuing for a three-year pilot program (1995 - 1997).

With \$8.6 million in funding support from:

- The National Science Foundation (\$3.5 million),
- Unisys Corporation (\$3.31 million),
- Six participating science museums (\$1.57 million),
- Six participating K-8 schools (\$0.23 million).

The Science Learning Network consists of six science museums that have partnered with single K-8 schools:

- **The Franklin Institute**, The Levering School (K-8), Philadelphia School District, PA,
- **Museum of Science**, Boston, MA, The Hosmer School (K-8), Watertown School District, MA,

The Science Learning Network consists of six science museums that have partnered with single K-8 schools:

- **Science Museum of Minnesota**, The Museum Magnet School (K-6, adding 7-8), St. Paul School District, MN,
- **Oregon Museum of Science and Industry**, The Buckman School (K-5), Portland School District, OR,

The Science Learning Network consists of six science museums that have partnered with single K-8 schools:

- **The Exploratorium**, San Francisco, CA, The Ross School (K-8), Ross County School District, CA,
- **Miami Museum of Science**, Miami, FL, The Avocado School (K-6) , Dade County School District, FL.

Unisys Corporation has provided additional technical and project management support.

Science Learning Network Project Goals

- Total school involvement (administration, teachers, students, and parents) over three years (1995 - 1997), T1 connection, single computer on each teacher's desktop.
- Creation of unique online resources to support teachers and students in their online classrooms (<http://www.sln.org>).

Science Learning Network Project Goals (cont.)

- Three weeks of teacher professional development in each of three summers.
- Three school year colloquia.
- Research and Evaluation Component.
- Develop an “electronic librarian” to facilitate WWW usage. Integrate with online resources.

Building Onramps to the
Information Superhighway:
Designing, Implementing, and
Using Local Museum
Infrastructure

Where Does One Begin?

■ Strategic Planning:

- assessing priorities; defining the relationship of your museum to the local and global communities,
- defining the relationship of online exhibits and programs to your museum's mission,
- developing a technology plan, funding plan, and marketing/PR plan as part of your strategic planning.

Phase I: Designing Museum Infrastructure

- Mission-based and Pedagogical Issues
- Conceptual Issues
- Technical Issues
- Economic Issues
- Political Issues

Developing Mission-based and Pedagogical Issues

- Who is your audience?
- How will you tailor content?
- What will the focus be on creating your first Internet resources?

Developing Mission-based and Pedagogical Issues (cont.)

- What set of production guidelines will you use? Do they already exist?
- What are the best ways to incorporate the new communications functions of your LAN (email, videoconferencing, chat, others)?
- What are the new collaborative potentials that this technology facilitates:
 - Museum to museum, museum to school, museum to home, museum to industry?

Conceptual Issues

- What is the Internet?
 - a network of networks,
 - no one owns it,
 - user-driven (consumption and production).
- How can we access the Internet?
 - low bandwidth -- 14.4 modem/phone line,
 - high bandwidth -- T1 line.

Conceptual Issues (cont.)

- What is involved with installing and using a local area network?
- What is an Internet Provider?
- What is the World Wide Web (WWW)?
- What is HTML (**H**ypertext **T**ransfer **P**rotocol)?
- What are Mosaic, Netscape, and Lynx?

Conceptual Issues (cont.)

- What staff needs must be defined for Internet access and resource production?
 - Information Systems Specialist,
 - Online Resource Developer,
 - Multimedia Designer,
 - Computer Graphic Designer,
 - Project Leader.

Technical Issues

- Important software protocols:
 - Transmission Control Protocol / Internet Protocol (TCP/IP),
 - Common Gateway Interface (CGI):
 - » Forms (user feedback),
 - » Image Mapping (navigational aids),
 - » Server push / client pull (simple animation over the network).

Economic Issues

- Ensure that adequate funding is in place before diving in!
 - Computer networks require constant care, maintenance, and upgrading,
 - Plan for at least five years for purchasing and maintaining computer hardware, software, and network wiring.

Political Issues

- Your technology plan must have top-down support or it will eventually die.
- Strong commitment to staff training and technical support.
- How does the installation of a technical infrastructure fit into your museum's mission?

Political Issues (cont.)

- Who will get connected to the museum LAN? When? Why?
- Do you have adequate funding for the next three years in place to support staff, hardware, software, and Internet connectivity?
- How will you maintain and leverage this commitment?

Phase II: Implementing Museum Infrastructure

- Mission-based and Pedagogical Issues
- Technical Issues
- Personnel Issues
- Economic Issues
- Political Issues

Mission-based and Pedagogical Issues

- Science Learning Network project teams as models for managing staff,
- Defining your niche as an information provider -- what makes you unique?
- Science museum environment -- testing new learning paradigms.

Technical Issues

- Local Area Networking / Wide Area Networking,
- High bandwidth -- T1 (1.544 million/sec.),
- Low bandwidth -- 14.4 modem / phone line (14,400/sec.).

Personnel Issues

- Hiring new staff with appropriate skill sets,
- Providing access to staff for training programs,
- Salary range considerations to support technology:
 - LAN/WAN = UNIX & TCP/IP,
 - HTML, CGI scripting, MAC & PC Windows environments.

Economic Issues

- Initial funding = grants, corporate sponsorships,
- Normalizing interworking infrastructure costs as standard overhead,
- High bandwidth connection costs:
 - @\$10,000-\$25,000 per year,
 - one time installation charge = @\$12,000,
 - maintenance contracts.

Political Issues

- Appropriate management structures:
 - matrix = larger groups, slower process but less room for mistakes,
 - single departments = smaller groups, quicker process but more room for mistakes,
- Technological haves and have-nots:
 - who gets connected first, second , third, etc.

Phase III: Utilization

- Conceptual Issues
- Strategies for Online Resource Development
- Strategies for Sustaining the Online Museum

Conceptual Issues

- The notion of a single meta-museum in which **we are all members by default**, that now exists because of the nature and design of the Internet and the World Wide Web.
- What is the impact of the medium (the Internet / WWW / videoconferencing, etc.) in which the online museum exists on its design?

Conceptual Issues (cont.)

- Should there be a strong coupling between the physical and online museums? To what degree? Can there be a variety of relationships?
- What is the impact of the user-driven nature of the WWW on resource creation vs. vanity publishing?
- How can the online museum enhance visits to the physical museum?

Conceptual Issues (cont.)

- What are the intellectual property issues?
- What are some of the common problems in using the Internet?
- What are some of the common problems maintaining resources on the Internet?

Strategies for Online Resource and Program Design

- Design and planning process recap; define your:
 - niche as an online information provider,
 - pedagogical model, based on museum mission,
 - audience demographics, prioritize according to the above,
 - goals for creating and maintaining online resources and programs,
 - strategic plan, technology plan, marketing/PR plan, funding plan.

Strategies for Online Resource and Program Design (cont.)

■ Creating the Online Museum:

- begin with your most visible and well known icons to establish your online identity and conceptual framework,
- virtual exhibits (traveling exhibit support),
- inquiry-based Units of Study,
- monthly publications,
- galleries (photo, video, audio),

Strategies for Online Resource and Program Design (cont.)

- Creating the Online Museum (cont.):
 - telepresence (telerobotics),
 - organized hotlists / bookmarks,
 - virtual interactives (CD-ROM client-enhanced, Netscape v.2.x),
 - computer simulations / modeling.

Strategies for Online Resource and Program Design (cont.)

- Navigational aids to consider in your online resource and program design:
 - hierarchical hyperlinks,
 - custom search engines,
 - table of contents,
 - custom hotlists / bookmarks,
 - preview gallery,
 - What's New!

Strategies for Online Resource and Program Design (cont.)

- What strategies can be employed to insure that users will come back to your online museum (i.e. if you build it they will come, but will they come back)?
 - online_docents / _explainers,
 - ask_the_expert, online mentors,
 - user_guestbook,
 - tell_the_president / _director,

Strategies for Online Resource and Program Design (cont.)

- What strategies can be employed ... (cont.)?
 - the museum store,
 - museum memberships,
 - What's New!
 - weekly / monthly publications.

Strategies for Online Resource and Program Design (cont.)

- Resource and Programs Evaluation Issues:
 - what metrics currently exist to evaluate quality?
 - what metrics currently exist to measure quantity? (number of server hits?).

Strategies for Sustaining the Online Museum

- First Steps, Next Steps ...
 - Potential pitfalls of a new medium that is rapidly evolving,
 - a market exists for teacher, adult, and youth Internet training, WWW training workshops, and integration into other workshops and programs,
 - define a marketing plan and PR plan for promoting your site, and cultivating your online audiences,

Strategies for Sustaining the Online Museum (cont.)

- First Steps, Next Steps ... (cont.)
 - develop a sponsorship benefits plan and online recognition opportunities,
 - integrate volunteers, interns, co-ops into your resource and programs development teams.

Strategies for Sustaining the Online Museum (cont.)

- how can you foster the growth of regional / global audiences?
 - register users via guestbook, special emailings about new programs and exhibits,
 - offer online memberships with special perks,
 - create online events -- design contests; post the winner's results, student projects, visitor projects,
 - create an online host, a full-time ambassador to create human feel and help mediate the text-bound limitations of webspace for your online visitors.

The Sky is the Limit!!

- The Science Museum Community offers an unlimited potential to develop:
 - new online programs and exhibits,
 - new audiences (online and physical museum enhancement),
 - new revenue generating opportunities.