Survey of public access to computing

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ABSTRACT

The Center for Inquiry and Discovery in Washington, D.C., is planning to establish a public computer center to be used primarily by school age children. A survey of existing public-access computing facilities throughout the country is being made in order to seek information and advice to assist in this planning. This paper describes the survey being undertaken, the institutions being studied and the findings to date.

SURVEY OF PUBLIC ACCESS TO COMPUTING

There is at present no public access computing facility in the Washington, D.C. area. Although universities and even some secondary schools have computers for student and faculty use, access to these systems is generally restricted. The Center for Inquiry and Discovery, a newly established institution in Washington, is planning to create a public computer center for a wide variety of uses.

The Center will organize computer-related workshops, classes, clubs and special projects for individuals, community groups and local schools. In addition, the computer will be used in the exhibit areas of the Center. There will be an exhibit devoted to computers, where the casual visitor will be able to learn something about the nature of computing and perhaps become interested enough to enroll in a class or workshop. The computer will also be used in some of the other exhibit areas to help to explain the subject matter using simulations or graphic displays where appropriate. Finally, a data bank describing community resources, available materials and upcoming events of possible interest to Center visitors will be available from terminals located throughout the exhibit areas.

In order to plan for this computer facility, a survey is currently being conducted by the Center to study similar programs at museums, science centers and other public institutions throughout the country. Also included in the survey are several research oriented labs (SOLOWORKS at the University of Pittsburgh, the LOGO project at MIT, Xerox PARC in Palo Alto) which have as a common goal the development of computer systems which can be used effectively by people having widely divergent backgrounds and interests.

Information is being collected about hardware, software, educational programs, staffing, types of users, costs and financing at these institutions. The following is a partial list of questions taken from a questionnaire being used in the survey.

Ties with other institutions

- What kinds of services are provided to local schools, colleges or community groups (e.g., field trips, classes during school hours, facilities for students to do individual projects, in-service teacher training)?
- Do students and teachers receive credit and release time for their participation?
- Does the center provide a time-sharing service for the schools or the community and, if so, what level of support is provided (e.g., development of curricular materials)?

Exhibits

- What philosophy about computing is shown to the one-time visitor?
- How are exhibits designed that are easy for visitors to use and understand, and which need minimal supervision?
- Is game playing the most effective use of computers in an exhibit area?

Educational programs

- What classes, workshops, and clubs are available for the public?
- Are educational programs provided for various age groups and levels of sophistication?
- How are educational programs, classes, workshops evaluated?

Equipment

- What kind of computer equipment (e.g., central system, terminals) is used?
• How is maintenance handled?
• What software packages are available for users?

**Staffing**

• What level of staffing is needed to support the computer center and its activities?
• To what extent does the center rely on students and other volunteers to perform staff functions (e.g., teaching classes, systems development, hardware maintenance)?
• Are volunteers reimbursed in some way for their efforts (e.g., receiving school credit, revenue from sales of software)?

**Financing**

• Is the computer center self-supporting or does it rely on general admission charges, grants or donations?
• Is the computer used to raise money by providing such things as mailing list and accounting services to other non-profit institutions?
• Is computer time sold to the public?
• Is tuition charged for classes and workshops?
• Are payments received for services provided to schools?

The following is a brief description of those institutions which have already been visited.

**Lawrence Hall of Science** on the University of California Berkeley campus is a science museum with a large staff of students. It has five computer terminals in the exhibit area running games and simulations and an extensive educational program of classes for school children and the public. Its three computers provide a low cost time-sharing service for over 35 educational institutions in Northern California.

**Oregon Museum of Science and Industry (OMSI)** in Portland has in addition to its exhibit area a community research center. The goal of this research center is to provide the community with access to otherwise unavailable scientific equipment. It has a PDP 11/40 that approximately 40 students per year use to do individual projects for which they receive high school credit. Advanced software development projects have earned revenue and equipment donations for the center.

**Community Computer Center** is a storefront computer center in Menlo Park, California, that offers the public access to recreational uses of computers. Their activities include a hardware club, classes for teachers, birthday parties, field trips, and game nights.

**The Exploratorium** in San Francisco is a large science center that hopes to use computers in the future to simulate scientific phenomena.

**Pacific Science Center** in Seattle is in the American exhibit building of the 1962 World's Fair. They are still planning their computer activities, but do have two terminals running games with time donated by various schools and businesses.

**Boston Children's Museum** has a computer, terminals, and calculators in an exhibit area for visitors and school children on field trips to use. They also use their computer for administrative purposes.

**Boston Museum of Science** has a large exhibit area with a computer and terminals donated by Honeywell.

**Franklin Institute** in Philadelphia has a terminal in the math area, running a demonstration package. Computer time is donated by businesses and schools. They also hold a summer computer workshop. They are planning to use the computer in a new Bicentennial exhibit.

**Maryland Science Center** is a new institution not yet open to the public. In a preview exhibit they used the computer-controlled turtle and music box developed at MIT's LOGO Project.

**The LOGO Project** at MIT has developed new ways for young children to learn mathematics and logical thinking using the LOGO language, computer-controlled devices and graphics.

**SOLOWORKS** at the University of Pittsburgh is working to develop the hardware, software, and coursework for an open mathematics laboratory. They use a wide variety of computer peripherals such as graphic displays, robots, and a pipe organ in their lab.

**Xerox PARC** has developed a computer system and a language called SMALLTALK which makes graphics and animation easy to use. They hope to open their own storefront computer center in the near future.

Other institutions which have been or will be contacted by telephone and visited in the future include: Ontario Science Center, Chicago Museum of Science and Industry, The Science Museum of Minnesota, Science Museum of Roanoke Valley in Virginia, Denver Children's Museum, Fernbank Science Center in Atlanta, and the Brooklyn Children's Museum.

While each site surveyed has its own unique features, certain ideas, programs and problems seem to be almost universal. Although the survey is not yet complete, a summary of the most common and most important points of information gives a picture of a "typical" public access computer center.

Coordination with local public schools is essential. The schools are the primary sources of users for a public access computer system. While the computer exhibit areas attract the attention of adult and child alike, the more in-depth behind-the-scenes activities such as workshops and computer programming classes, mainly attract school children. Many of these classes are official school functions, with the computer center being the site for repeated field trips from the schools. Payments from schools for use of the center's resources are often an important source of income.

Cooperation with local universities is important since college students are a valuable source of part-time or
volunteer staff. The possibility also exists to offer in-service training for teachers in the computing center for college credit.

Most of the institutions visited have computer terminals in an exhibit area. Simple games are the main mode of initially presenting computers to visitors, however, neither staff nor user interest is sustained if the only computer activities available are games.

Cathode ray tubes (CRTs) or silent printer terminals are preferable in the exhibit areas to decrease noise. Since the majority of museum visitors tend to read little of the printed text accompanying exhibits, graphics displays are an additional advantage. Simplified or color-coded keyboards are sometimes used, particularly with young children.

The level of staffing at the centers surveyed varies from the Lawrence Hall of Science with over 30 part-time staff members, most of whom are Berkeley students, to other institutions with only one part-time person. It is important to have at least one paid staff member whose responsibility is to coordinate and provide direction for all the various activities in the center. High school and college students who develop a strong interest become a valuable, but temporary, resource as instructors, programmers, and maintenance engineers.

All the institutions surveyed have received loans or donations of either computer hardware, computer time, or terminals. One institution has traded marketable software packages to a computer manufacturer in return for equipment (e.g., a disc drive). Although donations and loans were instrumental in the development of the various centers, they also have disadvantages. Donations of computer time are often short-term commitments. Software packages developed for a borrowed computer system must either be re-implemented or discarded when the hardware base changes. Donated equipment often presents a maintenance problem since the equipment tends to be several years old. Maintenance contracts are, therefore, fairly costly and parts are more difficult to obtain.

None of the centers is totally self-supporting. Most rely on general museum admission fees, grants, endowments and donations. These revenues are often supplemented by income from school field trips, classes, workshops, and sales of computer time to individual community members and groups. Many of the museums also use their computers to do their administrative work and have expanded to provide these services to other cultural institutions at low cost.

When the survey is complete, our goal is to have developed a model of an ideal public access computer center. It is our hope to build this center in phases as we acquire the necessary funds, personnel and experience. We envision it to be a non-profit, self-supporting computer center which will be able to grow as community acceptance and demands increase.