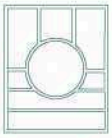
Promoting Access to Network Technologies in Underserved Communities:

Lessons Learned

Digital Steppingstones Project

Final Report

The Tomás Rivera
POLICY INSTITUTE



The Tomás Rivera
POLICY INSTITUTE

Founded in 1985, the Tomás Rivera Policy Institute advances critical, insightful thinking on key issues affecting Latino communities through objective, policy-relevant research, and its implications, for the betterment of the nation.

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EXECUTIVE SUMMARY

Information technologies are increasingly necessary tools in attaining educational and economic success, and for resolving community problems. The Tomás Rivera Policy Institute launched the Digital Steppingstones research initiative to explore the role of networked technologies in low-income and minority communities, and their effectiveness in meeting their information, education and communications needs. This research focused on public access centers—schools, libraries, and community centers—in urban communities with limited resources.

No single "model" program to provide access to information technologies was identified. Instead, strategies used by exemplary programs provide multiple solutions to common problems allowing for adaptation to individual circumstances, while leaving room for innovation. The Digital Steppingstones study highlights six strategies of successful public access technology programs: unity of vision, leadership, funding, partnerships and collaborations, staff development, and integration of technology.

Successful programs develop a Vision appropriate to their community's needs and align program practices to support the institutional vision.

Effective Leadership articulates program goals, provides guidance and direction toward achieving those goals, displays personal initiative and resourcefulness in developing partnerships and collaborations, as well as being innovative problem-solvers.

Funding is an on-going challenge and budgets are generally insufficient to establish or maintain an advanced technology program. It is necessary to diversify funding sources through fundraising, soliciting grants, or reallocating budget monies.

Partnerships and Collaborations improve the exchange of information and ideas, gaining access to resources, and increasing networks of contacts. Business and educational partners can provide money, hardware, software, technical support, training, expertise, and volunteers.

On-going Staff Development is a priority to make the fullest use of technology.

Integration of Technology into program curricula incorporates technology skills into learning goals, especially through project-based learning. This strategy underscores the value of technology as a tool.

Further findings suggest that while network technologies can have a positive impact on a person's quality of life, achieving literacy in reading, writing and arithmetic as well as computer and network technologies is necessary to receive the maximum benefits from these technologies.

Some study participants expressed their frustration with the lack of a coordinated, community-wide plan to create equitable access to network technology. This is often due to the fact that while money and other resources are available from the non-profit, private, and public sectors, many programs find it

difficult to expend already strained and limited resources on developing partnerships or writing grants. One solution may be to share resources, planning, costs, etc. between programs. While funds, personnel, training, and equipment may not be readily available in every organization wanting to create or improve a technology program, this problem could perhaps be overcome by coordinating the efforts of several institutions into a single collaborative access point.

End users are transitioning from being passive consumers of content to becoming active creators of content and knowledge. This trend should result in more Internet content that meets the needs and interests of specific groups.

Equitable access to information and communication technologies, and the skills and training necessary to use them effectively, remains an important mandate that requires collaborative efforts between the public and private sectors, and also within the community of public access centers. The following policy recommendations can help reach this goal:

PUBLIC ACCESS CENTERS

- Develop more public access centers for those who do not have access to technology at home, and where users can learn new skills
- Conduct local community needs assessments to identify the most important needs and tailor the organizational vision to meet those unique needs
- Collaborate with both the private and public sectors to leverage resources
- Network with other community technology centers to share knowledge and information
- Invest in continuous staff development
- Foster the creation of relevant on-line content, particularly through encouraging end users to become both consumers and creators of content

PUBLIC SECTOR

- Expand the E-rate program and include funding for professional training
- Establish digital literacy standards for both end users and staff
- Increase awareness of the importance of computer and network technologies in various sectors of everyday life

PRIVATE SECTOR

- Increase bilingual and Spanish language websites
- Create on-line content relevant to specific ethnic groups

I. INTRODUCTION

Statistics from the National Telecommunications and Information Administration (NTIA) for the year 2001 indicate that a gap in access to technology continues to exist along two important dimensions: income and race.[1] Not only are low-income communities significantly less likely to have access to computers and the Internet, but Latino and African American households are also less likely than White households to have access, even when controlling for socio-economic status.

Given continuing problems regarding home-based access to computers and the Internet, other strategies for enhancing access need to be explored. As important alternatives, schools, libraries and community centers are increasingly serving as points of public access to increase technology penetration rates in low-income and minority communities.

The Tomás Rivera Policy Institute (TRPI), with funding from the W.K. Kellogg Foundation, launched the Digital Steppingstones (DSS) research initiative to determine how public and community access to information technology is best achieved in the nation's low-income urban areas. The objective of this three-year study was to explore the role of public access centers in providing network technologies in low-income and minority communities, and their role in enhancing middle and secondary schools, preparing community members for the workforce, and filling communities' information needs. The DSS project identified 25 successful community technology programs in five urban areas—Los Angeles, Chicago, Houston, Miami and New York City. Schools, libraries and community centers were chosen for analysis since they typically provide the most common points of public access to advanced technologies in underserved communities. Each of the 25 programs was selected because it successfully implemented one or more of the strategies identified by DSS research as characterizing exemplary information technology programs. Indeed, these 25 schools, libraries, and community centers studied by TRPI have developed outstanding strategies designed to assist low-income minorities in achieving equitable access to the Internet and its many resources.

[1] National Telecommunications and Information Administration. *A Nation Online: How Americans Are Expanding Their Use of the Internet.* February 2002. U.S. Department of Commerce.

TRPI identified several overarching research questions to guide the DSS project:

1. What is the role of network technologies in low-income and minority communities throughout the United States?

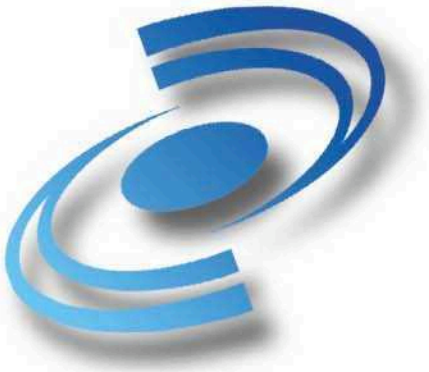
2. Where, how, and by whom are emerging digital technologies being used?

3. How are information technologies being used to improve the quality of life for people living in underserved communities?

4. What can be done through policy and program initiatives to ensure that people from all backgrounds and circumstances have equitable opportunities to benefit from these new technologies?

There are two primary objectives of the DSS study. First, because overcrowded and under-funded public institutions are a common feature of low-income communities, the programs highlighted in this report have overcome considerable obstacles in providing equitable access to technology. This report identifies the specific strategies that these programs are using to increase access to information technologies in underserved communities. Second, identification and description of these strategies allows policy makers, community leaders, educators, librarians, parents and others to replicate effective technology programs in their own communities.

II. DATA GATHERING & RESEARCH



The DSS project unfolded in several phases. In Phase 1, TRPI conducted site visits and convened roundtable discussions in each of the five cities under study to begin exploring the research questions listed above. Preliminary site visits and interviews were conducted prior to holding the roundtables in order to identify appropriate roundtable participants in each city. Interviews were semi-structured, revolving around a discussion of the history of the program, funding and sustainability issues, decision-making procedures, technology penetration and dispersion, wiring, technology infrastructure and platforms, and professional development. An interview guide provided a degree of standardization between the interviews and ensured that all pertinent areas were covered. Whenever possible, site visits were conducted when end users were present to get a sense of the working environment. A concerted effort was made to investigate as many promising programs as possible in anticipation of the next phase when we would begin to identify exemplary programs.

The roundtable discussions were comprised of knowledgeable librarians, educators and community members representing the diverse learning environments under study. An analysis of the wealth of insights shared by participants in Chicago, Houston, Los Angeles, Miami and New York City allowed us to ascertain what information technology program characteristics were strong indicators of success, as well as identify unique solutions to common problems. A national conference held in October 1998 and an advisory committee meeting held in January 1999 served to further the dialogue begun in the roundtables around needs and applications for network technologies and their role in underserved communities. The advisory committee was composed of individuals who are knowledgeable on a variety of information technology issues. The primary outcome of Phase 1 was a better understanding of the characteristics and features of exemplary programs, as perceived by community stakeholders. This template was subsequently applied to identify specific programs to study in greater detail.

During Phase 2, a systematic collection of potentially commendable programs was performed through a national nomination process. On two separate occasions "Requests for Nominations" were announced via the TRPI information technology mailing list and electronic listserv and was also posted on the website. The complete list of nominated programs included those nominations received through the nomination process, those recommended during earlier site visits and roundtables, and those identified through independent TRPI research.

Phase 3 involved an extensive review of nearly 200 nominations that resulted in the identification of a group of 25 programs that were implementing exemplary strategies, plus 4 programs meriting honorable mention. Programs were chosen based

on a two-step selection process. First, a program had to meet the minimum eligibility criteria as outlined in the "DSS Nomination Criteria." According to these criteria, each site must be:

- A school, library, or community center
- Located within the five-city metropolitan statistical area
- In a low-income community with a poverty rate of 25% or more

Second, a rubric based on findings from the initial research activities conducted in Phase 1 was created to identify exemplary program strategies. Using this rubric, nominations that met the minimal criteria were analyzed for program content by reviewing all available program material. The rubric evaluated many program characteristics, with an emphasis on the following:

- The integration of technology into curriculum
- The availability of professional development
- The presence of partnerships and other collaborative efforts
- The use of a technology plan
- The availability of staff for assisting and training users.

Based on this analysis, 25 programs were selected because they each used a combination of exemplary strategies to achieve success in communities with limited resources.

Following the selection of the 25 programs, in Phase 4 researchers administered on-site, in-depth structured interviews with decision-makers, technology coordinators and staff at each selected school, library and community center.[2] The structured interview instrument consisted of over 50 questions and was designed to examine the core issues brought up in the earlier phases of research. The interviews covered quantitative questions, as well as qualitative questions that were sufficiently open-ended to allow new, unexpected principles, strategies, and best practices to emerge. In addition to the 'core' interviews, approximately 500 end user surveys were collected. These surveys asked about 20 questions regarding user experiences with and attitudes toward technology. Where appropriate, Spanish-language surveys were provided. It is important to note that the results of the end user surveys are not representative of every person attending a particular school or visiting a library or community center. Rather, the end user surveys represent the responses of only those individuals participating specifically in the technology program.

Finally, data gathered through the interview and survey process were analyzed for both qualitative and quantitative findings. Because each stage of the research informed the next, the information that follows represents the findings of data gathered in all stages of the project, including site visits, roundtable discussions, advisory committee meetings, a national conference, structured interviews and surveys.

[2] At some sites, four people were interviewed, while at others only two people were interviewed. The inconsistencies were due to duplicate job roles and/or staffing differences and were accounted for in our statistical analysis.

III. FINDINGS

Before getting into the programmatic nuances of the exemplary sites, an overview of some of the features that were generally common across sites is provided, collectively considered as "infrastructure." Infrastructure at the sites consisted of both the hardware and software, but also the core support services provided for community users. For example, a primary feature of each of these successful information technology programs is their ability to provide access to a wide range of advanced technologies. Although the programs varied in their technology infrastructure, their overall level of technology, and thus their ability to provide access, was similar.

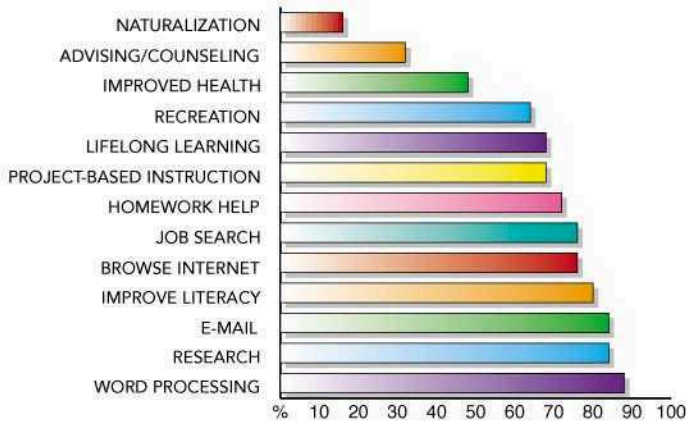
While having one computer connected to the Internet may constitute "access," it does not provide adequate opportunities for usage

While having one computer connected to the Internet may constitute "access," it does not provide adequate opportunities for usage. An established indicator of access is the ratio of computers to users and, on average, these programs have two computers for every five users. Three-quarters of the programs surveyed offered both Macintosh and Windows-based PCs and nearly all of the programs have computers that are connected to CD-ROMs, scanners, digital cameras, laser printers and other peripheral technology. Another feature of successful programs is that they continually update their technology. For example, no program in this study relies solely on non-Pentium class computers. In fact, over half of the computers in the selected programs are between 200–500 MHz processor speeds and nearly every program has at least some new or recently purchased computers over the 500

MHz threshold. Finally, Internet access is almost exclusively provided by direct connection, usually a T-1 line or faster, giving users with slower dial-up access at home an incentive to visit public access centers for high-speed broadband access. Those terminals not connected to the Internet are generally set up for scanning, geographic information system (GIS) access, color printing, or other resources. Finally, successful programs are those that provide access to the computer technologies most needed by their patrons, whether word processing and multimedia applications for job training in community centers or Internet access for research in schools.

Figure 1

APPLICATIONS OF COMPUTER RESOURCES: ALL PROGRAMS



Most programs are also geared toward assisting users in improving both basic and computer literacy skills, as well as teaching word processing and general research skills and navigating the Internet. Libraries and community centers additionally attract users by providing homework tutoring and mentoring for students and assistance in job searches and job training for adults. To a lesser extent, other applications allow users to obtain health care information, receive advice and counseling or get help with the naturalization process. The programs tend to offer the traditional Microsoft Office or Corel Suite software packages that include word processing, spreadsheet, database, presentation and multimedia software. Graphics and desktop publishing instruction, including HTML and web programming, and drill or tutorial software for educational needs are also popular. Finally, while much of the hardware and software at the selected programs is state of the art, older technologies are also effectively incorporated and play an important complementary role (See Figure 1: Applications of Computer Resources: All Programs).

While each successful program has a technology infrastructure unique to the purposes of the organization, data analysis identified three organizing principles common to each: Vision, Organization and Purpose. Vision identifies the specific needs of the community being served, incorporates those needs into the technology program and then effectively communicates the goals of the program back to the community at large. Organization incorporates solutions to overcoming the problems of sustainable funding and creating effective partnerships to enhance technologies. It encompasses how the programs are structured internally, but perhaps more importantly, how they relate to other organizations. Finally, Purpose promotes the practice of integrating technology into the overall program curriculum so that technology becomes a teaching tool rather than an end in itself.

These general principles are put into practice through six common strategies that contribute to a program's ability to achieve the goal of equitable access to technology:

1. Unity of Vision
2. Leadership
3. Funding
4. Partnerships and Collaborations
5. Staff Development
6. Integration of Technology

It is important to note that these six strategies are not mutually exclusive. In other words, characteristics of one strategy are often found within another strategy and as a result some examples of "best practices" are applicable to more than one strategy. For example, having a written technology plan is clearly a best practice in integrating technology into the curriculum, yet it is also an important factor in creating a unity of vision for the program.

IV. EXEMPLARY PROGRAM STRATEGIES

Strategy 1: UNITY OF VISION

Vision describes the manner in which a program conceives of its overall goals. By their very nature, vision statements are images—not prescriptions for action. Instead, it is the mission statement that tailors the vision to specific program goals. While the mission may change with circumstances the broader vision will likely remain the same. In determining its overall goals, two significant issues face all information technology programs: identifying who the program will serve and finding the appropriate location or venue to best serve that population. Nearly all of the programs in this study include students and youth as their primary focus, but none are limited to just this segment of the population. One-third of the programs provide services aimed at groups such as working parents, homemakers, immigrants, and the unemployed, and over a quarter incorporate senior citizens into their technology agenda. More than half of the programs state that over 60% of their users are at or below the poverty level, 55% of users are Latino, and another 35% African-American. Facility location is also an important consideration in creating a successful program. For example, 90% of library patrons living less than one mile from their local branch reported that it was very important to them that the library provided computers for their use; however, only 74% of patrons living just two miles away felt the same. Clearly, in crafting a vision for a successful program one consideration is that the program be conveniently located where the need is greatest to provide access to many segments of the population. While not analyzable from our data, there is most likely a gradient of use that is defined by physical distance and public transportation corridors (See Figures 2-11: Population Distribution and Target Population).

Figure 2

POPULATION DISTRIBUTION: ALL PROGRAMS

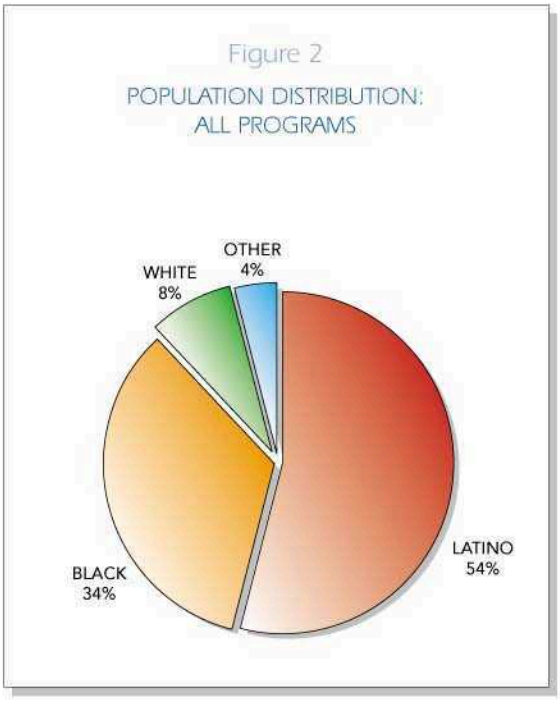


Figure 3

POPULATION DISTRIBUTION OF PROGRAMS: SCHOOLS

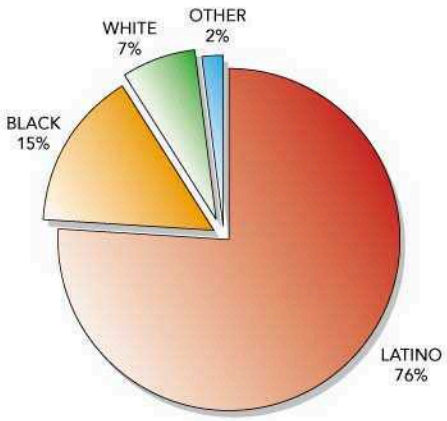
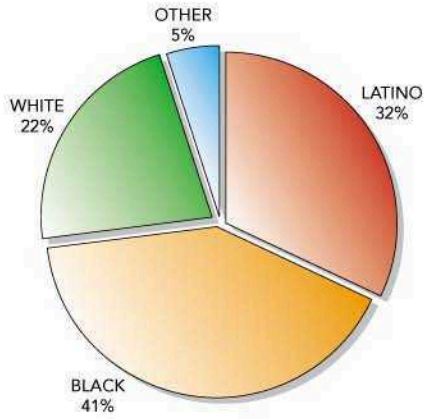


Figure 4

POPULATION DISTRIBUTION OF PROGRAMS: LIBRARIES



The programs included in this study were all successful in designing a vision to serve a specific community. Although each program has a unique vision due to the differing missions of schools, libraries and community centers, the goal of equitable access to technology is a common denominator. The exemplary schools we studied typically incorporate into their vision a commitment to provide information technology access specifically to youth. In schools, the definition of access is generally broad and can include goals as wide ranging as teaching basic literacy skills to job training. On the other hand, libraries see themselves primarily as a community information resource. While traditionally the role of the library has been to provide access to print infor-

Figure 5

POPULATION DISTRIBUTION OF PROGRAMS: COMMUNITY CENTERS

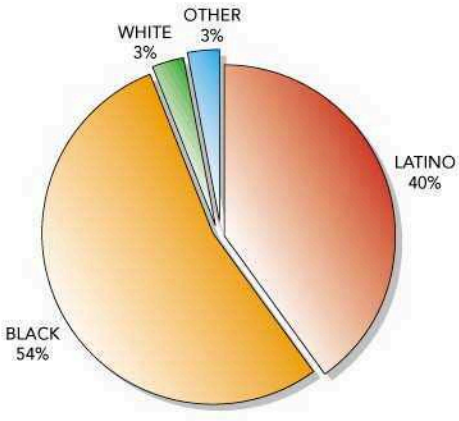


Figure 6

POPULATION DISTRIBUTION OF PROGRAMS: CHICAGO

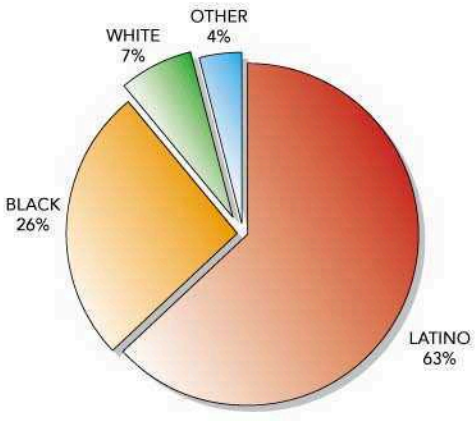


Figure 7

POPULATION DISTRIBUTION OF PROGRAMS: HOUSTON

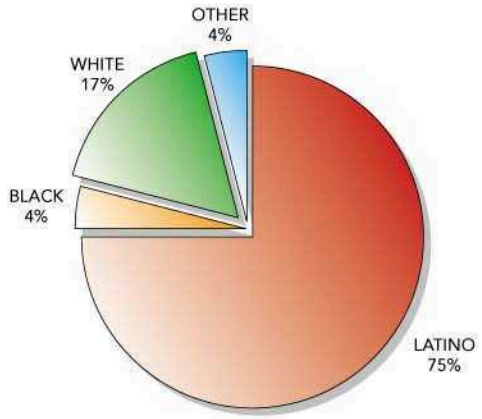
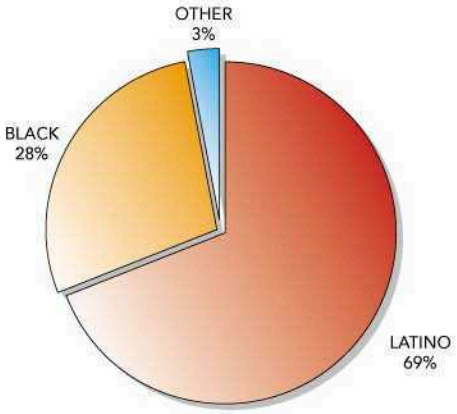


Figure 8

POPULATION DISTRIBUTION OF PROGRAMS: LOS ANGELES



mation, in the information age this role has expanded. The vision of libraries today includes providing access to information technologies in order to surmount obstacles of literacy and language and to forge relationships and links to other community institutions. Finally, because individual community centers have different missions, the vision of community centers is not as generalizable as it is for other program types. For some community centers the vision is to empower communities to improve their quality of life. For others, the vision is to help community members, especially youth, become literate with digital technologies. Still other community centers are concerned with providing a safe haven in which to provide education programs.

Figure 9

POPULATION DISTRIBUTION OF PROGRAMS: MIAMI

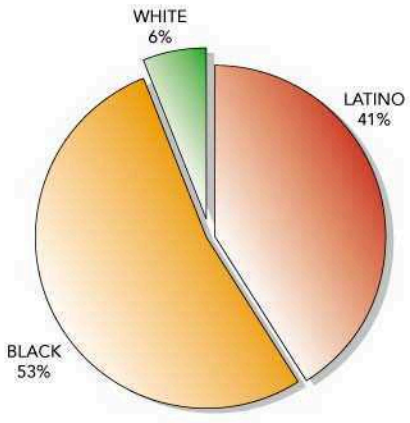
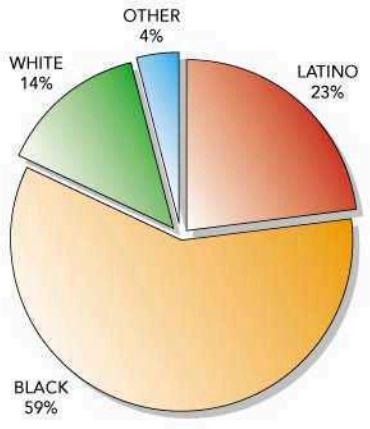


Figure 10

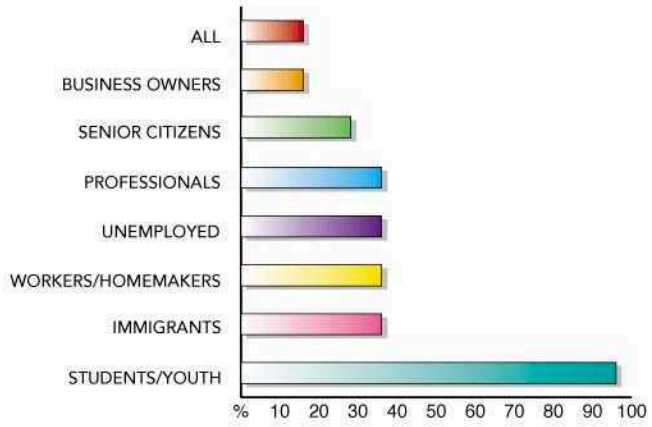
POPULATION DISTRIBUTION OF PROGRAMS: NEW YORK



Whatever the particular vision of a technology program, commitment to a unified vision of equitable access enables technology to be more thoroughly integrated into the curriculum and activities of the organization. On the other hand, when the vision is not held in common, people can work at cross-purposes, program support is not forthcoming, and program users may not receive the benefits intended. Several factors contribute to the ability of a program to create a unified vision: choosing a vision that reflects the needs of the community being served, stating the vision in a clear manner, and developing "buy-in" to the vision among the staff and community.

Figure 11

TARGET POPULATIONS:
ALL PROGRAMS



Best Practices

CHOOSING THE VISION

An effective vision is one whose mission can be tailored to meet the specific needs of the community being served, and that can be easily articulated to relevant stakeholders. In practice this could mean either narrowly focusing the program on the needs of a specific target population or crafting a vision with goals for multiple groups. For example, a school with the vision of creating equitable access to technology may use technology to achieve the goal of basic literacy for at-risk students while also using technology to teach higher-level creative thinking and analytical skills for more advanced students. Some of the programs will incorporate key words, catch phrases or "branding" language into their vision statements that tend to stick in the minds of constituencies.

Examples

FREDERICK DOUGLASS LEARNING CENTER:

To use technology to improve students' basic literacy skills. Skilled reading teachers create individualized instructional programs for each student and then work closely with students to monitor progress.

BROOKLYN PUBLIC LIBRARY:

Their vision "Get Smart—Get Connected" is a cooperative effort in which the library provides an expansive list of on-line links to Brooklyn organizations that in turn make their resources available to library patrons.

ERIE NEIGHBORHOOD HOUSE:

To empower all community members by providing technology programs for youth as well as classes for adults.

STATING THE VISION

Stating the program vision is a strategic act in itself. A clearly and succinctly stated vision makes it easier to formulate a mission with feasible goals and specific objectives. In this study, most programs had a vision that articulated a sense of social equity and a desire to prepare individuals to fully participate in the 21st century. A technology plan is one tool that helps to fully develop and clarify the ideas of the vision.

Examples

FOSHAY LEARNING CENTER:

"Meet the special needs of students in urban centers by tailoring their education to remove barriers to learning."

BRESEE FOUNDATION CYBERHOOD:

"Take people beyond where they are and into the 21st century using technology as a tool."

CHARLES HAYES FAMILY INVESTMENT CENTER:

"Developing human capital."

THE VISION AS PART OF THE TECHNOLOGY PLAN

A technology plan keeps an organization true to its vision while the vision guides the technology plan to meet changing needs. As a result, a technology plan provides a framework for both stating and implementing the vision. While a program may succeed without a clearly articulated technology plan in place, an organization that lacks a technology plan is more likely to encounter major and expensive diversions that can jeopardize the success of the entire program. About three-fourths of all programs in this study currently have a written technology plan, most of which are part of a larger, overall strategic plan. Of those programs that do not have a technology plan, most planned to develop one within the next year. Whether part of a larger strategic plan or a stand-alone document, a technology plan communicates the vision by establishing implementation procedures, explaining the decision-making process, setting future goals and clarifying the intended uses of technology.

A technology plan is one tool that helps to fully develop and clarify the ideas of the vision

Examples

JOSE CLEMENTE OROZCO ACADEMY:

The vision of the principal is to change the philosophy of the school toward integrating technology into the curriculum and hire the right people to help implement this change. The technology plan supports that vision and vice versa. While the technology plan establishes requirements that teachers use technology as part of their lesson plans, it also helps to clarify the instructional needs of teachers in order to meet these technology requirements.

QUEENS BOROUGH PUBLIC LIBRARY —WORLD LINQ:

The technology plan is part of the library's overall strategic planning concept of analysis, recommendations, action plans, and strategic goals and was developed to provide structure, accountability, and staff buy-in. Today the technology plan is considered a work in progress.

STREET LEVEL YOUTH MEDIA:

The technology plan was created to provide long-range planning for the program by focusing the vision while simultaneously allowing it to evolve. Since the program is lead by five co-directors, the technology plan also prevents repeated discussions on program focus.

Programs that meet the needs of the community will help build community support and participation

DEVELOPING BUY-IN TO THE VISION

Unity of vision is best achieved by developing "buy-in" among staff, program participants and community members. "Buy-in" occurs when people understand and share the vision and are committed to the success of the program. Buy-in may be understood from the perspective of the community, parents and the program staff.

COMMUNITY

Community members are more likely to support a technology program if it meets their needs, therefore community buy-in can be achieved by giving community members a voice in the decision-making processes of the program. Whether offering classes in typing, using various software packages or computer repair, opening computer labs to community access on evenings and weekends or using technology to teach other valuable skills such as resume writing or job-hunting techniques, programs that meet the needs of the community will help build community support and participation.

Once buy-in is achieved, community members have an active interest in the organization that has helped them and they are often willing to offer back to the program the depth and breadth of the community's resources such as providing leaders, advocates, partners and financial supporters, volunteers, facilities, in-kind donations, services, and active political support.

Examples

JOSE CLEMENTE OROZCO ACADEMY:

The technology plan is community-based and stakeholders include parents, students, teachers, and community members. Parents have ongoing input regarding the technology infrastructure, staff development, and learning activities and the principal holds an annual "town meeting" where parents can express their technology needs and desires.

RIVERSIDE PUBLIC LIBRARY
—EASTSIDE CYBRARY CONNECTION:

Prior to the opening of the Cybrary, the Eastside Cybrary Advisory Board was created to provide support for the project, advice on recruiting children to participate in the program, and guidance on the implementation of the project. Among the many groups participating in the advisory board were members of a senior citizens group, members of the Eastside Neighborhood Action Committee, the Eastside Settlement House, and professors from the University of California, Riverside.

MIAMI/MIAMI-DADE WEED AND SEED:

Weed and Seed is a collaborative strategy with two primary goals: to eliminate violent crime, drug trafficking and drug-related crime; and, to provide a safe environment for law-abiding citizens to live, work and raise families. Ten law enforcement and 72 economic and social agencies in the community support this vision and form the Steering Committee.

PARENTS

Strong parental involvement has a positive effect on the success of a technology program. Because many parents worry that access to computers will result in their children playing computer games or seeing unsuitable material on the Internet rather than engaging in educational activities, successful technology programs are able to overcome these worries by incorporating parents into the decision-making process. Furthermore, offering supplementary programs aimed directly at parents encourages greater parental involvement. Programs such as a health clinic at the school campus, weekend workshops to improve résumé writing and job interview skills, or computer classes with day-care service provided by volunteers all help to meet the needs of parents while also creating program buy-in.

Examples

HOMEBASE8:

Following 12 hours of required training for parents, an iMac Computer is placed on loan in the home of every 6th and 7th grade student.

RIVERSIDE PUBLIC LIBRARY'S EASTSIDE CYBRARY CONNECTION:

Families of students who complete computer training at the Cybrary are eligible to buy a locally-produced computer ensemble at near cost, complete with on-line connection. Parents may take out a low-interest loan from the city credit union. Not only does the Cybrary meet its goals of creating community access to electronic services, but families who pay off the loan also establish credit and are introduced to banking services.

HARAMBEE CHRISTIAN FAMILY CENTER:

Final decisions for hardware and software are made by the program director with input from parents, students, the teaching staff, vendors, and the Board of Directors.

STAFF

Without staff cooperation, the program vision remains unrealized. Developing cooperation by developing staff buy-in is more likely when the staff values the goals of the program. Achieving this type of buy-in requires actively working to instill the program vision into staff members. One such opportunity occurs during the regular course of training new hires and old staff on new technology. Such training sessions allow for teaching and clarifying the program vision and also provide an opportunity to learn collaboration and teamwork skills—all of which encourage staff buy-in.

Examples

FOSHAY LEARNING CENTER:

Because of staff turnover and new technologies there is a continual need for training teachers. These training sessions provide an opportunity to not only educate teachers in new technical capabilities, but also instruct them in the philosophy of Foshay.

CHICAGO PUBLIC LIBRARY —CYBER NAVIGATORS:

During the selection process, candidates for employment are screened for their people/interaction skills in addition to their technical abilities. In short, acceptable candidates are those who are trainable in the library's vision of public service.

ERIE NEIGHBORHOOD HOUSE:

Following the dynamic leadership of the past Executive Director, the staff are notable for their commitment to the program vision that treats clientele as professionals, with dignity and respect, providing enrichment for the whole person and, by extension, the community at-large. New employees are hired for their commitment first to education and second to technology.

Recommendations: **UNITY OF VISION**

- Identify the needs of the community to be served through surveys, community meetings, advisory committees, etc. Based on the community needs assessment, tailor the organization's vision to meet these specific needs.
- Write a clear and succinct vision in order to better formulate program goals and objectives.
- Encourage buy-in to the program by generating staff and community involvement.

Strategy 2: LEADERSHIP

The leadership of individuals who demonstrate both vision and entrepreneurial drive in establishing and directing a technology program cannot be underestimated and outstanding leaders characterized every one of the selected programs. A strong leader can clearly articulate the goals of the program and coordinate efforts toward achieving those goals by providing guidance, direction and support to staff. Although some programs may have several recognized leaders, these traits are evident in the often single-handed leadership of a principal, head librarian or director. In addition to seeking out partnerships with other institutions and developing industry relationships, successful leaders display personal initiative and resourcefulness by targeting potential grant sources and writing proposals to obtain funding.

Given the importance and prevalence of individual leaders, programs can be dramatically affected by changes in leadership. When a leader who solely possesses the vision of technology leaves, the motivation to achieve the vision may dissolve. A strong leader who has personally cultivated funding relationships can also leave a program stranded upon departure. In the course of our research, we encountered several examples of model programs that had declined following the loss of a leader committed to the presence of technology in the program. Because of the costs associated with sustaining state-of-the-art technology, a new leader who is inexperienced, indifferent toward technology, or simply unwilling to commit the time and effort needed to develop funding or partnership strategies will generally not place a high priority on technology. Avoiding such a loss of organizational direction requires planning for a sustainable program.

Long-run program sustainability requires staff "buy-in," empowering staff to actively participate in formulating the vision and refining it as the organization grows. The consistency of vision that results from staff buy-in will sustain the organization through changes in individual leadership. However, whether a program is led by one leader or many leaders, the most successful programs are those guided by innovative leaders.

Best Practices

INNOVATIVE THINKING

An innovative leader finds new approaches to common problems. Creating a successful program to bring technology to underserved communities requires:

1. ingenuity in finding funding sources and taking the initiative in approaching potential funders and partners;
2. resourcefulness in using an often limited technology infrastructure;
3. flexibility in budgeting both funds and staff time; and,
4. being pro-active in making the program a reality.

Innovative leadership in establishing such a program may occur at either the central or local level. For instance, because public library systems are centralized, an innovative leader is likely to have the greatest impact at the center where technology decisions are dictated to the local branches. However, because school districts tend to allow flexibility among individual schools, local leaders, such as principals, have the opportunity to design and implement an innovative program at their own site. Similarly, community centers have even greater opportunities for creative local leaders to emerge. Community centers generally have a small staff, work in teams to maximize their talents and have relative autonomy of action because they are locally-based and not tied to the dictates of a larger regional organization.

> The leadership of individuals who demonstrate both vision and entrepreneurial drive in establishing and directing a technology program cannot be underestimated

Examples

RIVIERA MIDDLE SCHOOL:

The principal is resourceful in utilizing limited funds, flexible in assigning staff to teams to meet changing needs, working with the community to generate buy-in, and taking the initiative to meet problems head-on. However, partnerships are perhaps the greatest area of innovation for Riviera. As a middle school in a feeder system, the principal looks for partnership and collaborative opportunities with both elementary and high schools. For instance, Riviera has formed a virtual campus with Cypress Elementary, Southwest High School and Florida International University to participate in project-based learning activities. Riviera students have also acted as technology trainers for the high school.

BROOKLYN PUBLIC LIBRARY:

The executive director helped to construct a "knowledge network" in Brooklyn through a joint effort with the Brooklyn Children's Museum and the Brooklyn Museum of Art. The result, the Brooklyn Expedition Website, seeks to increase educational services to the community by offering teachers, children and families a new way to access three sources of information in one convenient place. Brooklyn Public Library sees this partnership as a new means of reaching its core customers and provides the technical support and resources necessary to access the content of the other organizations.

TOWN PARK PLAZA NORTH NEIGHBORHOOD NETWORK CENTER:

The site manager has been remarkably resourceful in creating partnerships to meet the needs of the Center. The site manager used an "asset mapping" technique learned from the Department of Housing and Urban Development to identify local organizations that could help the Center and, as a result, Town Park currently lists 26 partners. Town Park is also exceptional because its program operates on so little income, has a staff comprised of volunteers paid by sponsoring organizations, and donations provide most of the equipment and material support.

PUENTE LEARNING CENTER:

PUENTE stands for People United to Enrich the Neighborhood through Education. Gifted with an exceptional leader, and dedicated to the empowerment of individuals in the neighborhood, the Center's focus on basic education includes innovative yet pragmatic programs carried out with a wide variety of funding sources and strong community support developed by the executive director.

COMMUNICATING THE VISION

A strong leader can enlist the participation of others by effectively and consistently communicating the vision. To do so, leaders must communicate the vision to all levels including administrators, technology coordinators, teachers and program instructors, partners, funders and program participants, and make certain that program activities support the vision. A strong leader can clearly articulate the goals of the program and coordinate efforts toward achieving those goals by providing guidance, direction, and support to staff. The vision can be communicated through many means including e-mail, the technology plan, the program website, partnerships, press releases to the community and community events.

A strong leader can enlist the participation of others by effectively and consistently communicating the vision

E-MAIL

In an effort to facilitate communication among staff members, many programs provide their staff with both internal and external e-mail. E-mail is used to schedule meetings, exchange ideas, and to disseminate policy and procedures. The value of using e-mail as a vehicle for leadership and participation in an organization cannot be underestimated. It has the psychological value for some of "feeling connected" to co-workers and the organization.

Examples

HOGG MIDDLE SCHOOL:

The vision for the information technology program at Hogg Middle School is to create an environment in which technology will be embedded into the curriculum of every class; however, lack of a thoroughly accessible district maintained e-mail system thwarted that purpose. To deal with this issue, the principal had all staff members establish accounts with Hotmail. This allowed them to establish a 'site-based' e-mail system that they had control over as far as staff enrollment is concerned. Furthermore, these e-mail accounts are accessible from home.

RIVERSIDE PUBLIC LIBRARY —EASTSIDE CYBRARY CONNECTION:

The library director replaced her "in-basket" with e-mail. Through e-mail, she maintains professional contacts, plans meetings, and has reduced the logistics of planning meetings. As a result, she has become more of a "hands-on" manager because she has greater communication between management and staff.

STREET-LEVEL YOUTH MEDIA:

Since five co-directors share leadership, communication is of critical importance. One of Chicago's veteran community center workers, Charlotte Saenz-Boldt, Co-Director and Drop-In Program Director, stated that putting things in writing is one way of combating problems of clarity, miscommunication and differences in vision.

Recommendations: LEADERSHIP

- Think outside usual assumptions and beyond barriers to see new approaches to problems.
- Communicate the organization's vision at every opportunity and by all means including e-mail, the technology plan, the program website, partnership agreements, press releases to the community, and community events.
- Disperse leadership by engaging staff in planning and action as the organization grows.

Strategy 3: CREATIVE FUNDING

The single-most pressing issue for all sites in this study, regardless of location or type of program, is funding. This is true not only for acquiring the necessary equipment and training to set up a program, but also for sustaining the program in the long run. Since computers must be replaced or upgraded at least every three years to remain current, the inherently rapid obsolescence of information technology amplifies the problem of funding. For programs whose users are destined for the business or technology sector, the need for current technology replacement is closer to one to two years.

Bringing a building's infrastructure up to current standards is another costly undertaking that is necessary to fully implement a comprehensive information technology program that includes extensive computer access and networked multimedia capabilities. Some locations face the challenge of wiring exceptionally old buildings. This is particularly difficult in the oldest building sites, which can be over 100 years old, or where electrical outlets are insufficient for the demand. Even acquiring the

Figure 12

SOURCE OF TECHNOLOGY FUNDING: ALL PROGRAMS

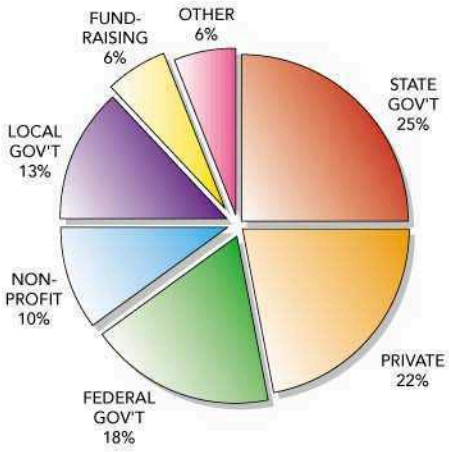
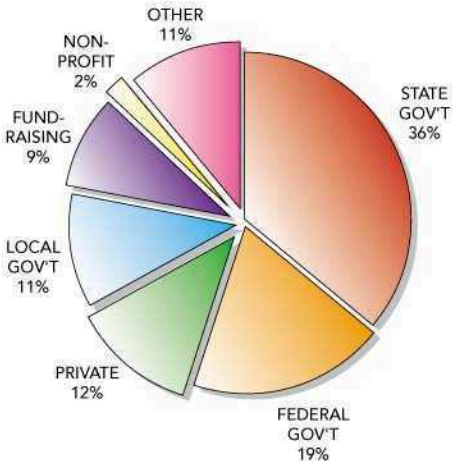


Figure 13

SOURCE OF TECHNOLOGY FUNDING: SCHOOLS



resources necessary to rewire a 20-year-old building can be problematic for some already strained budgets. Several program directors pointed out that it could be difficult to convince stakeholders to invest enormous amounts of money into a project such as electrical wiring that is mostly unseen (See Figures 12-15: Sources of Technology Funding).

On average, the programs under study report that about 25% of their current funding comes from state government, 22% from private sources and 18% from the federal government; however, the distribution of funding varies widely for each program type. For instance, 9 of the 25 programs stated that they received no federal funding, while four reported that they received over one-third of their funds from the

Figure 14

SOURCE OF TECHNOLOGY FUNDING: LIBRARIES

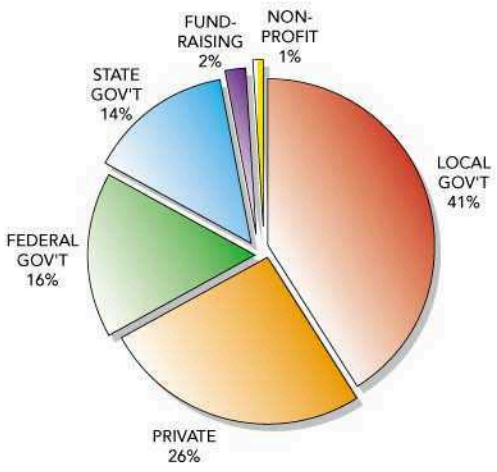
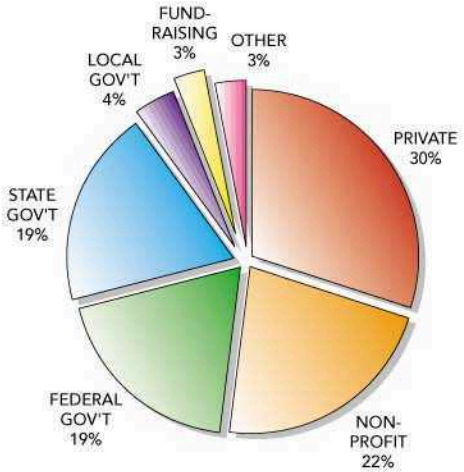


Figure 15

SOURCE OF TECHNOLOGY FUNDING: COMMUNITY CENTERS



federal government. Schools and libraries received approximately two-thirds of their funds from the federal, state and local government and both benefitted from the federal government's E-rate program[3] that provides discounts on advanced telecommunications services. Many schools sought private funds and grants from both nonprofit foundations and corporations. Community centers tended to have multiple sources of funding and tended to be much more innovative in their funding strategies, perhaps in part because they were not eligible for government programs like the E-rate and generally had less bureaucracy to navigate. In fact, four community center programs had no federal funding at all. Instead, community centers relied on private and non-profit sources for about half of all funding. Because annual budgets are generally insufficient to set up and run advanced technology programs, diversifying funding sources through grants, fundraising, and reallocation of budget monies is absolutely necessary.

Best Practices

GRANTS

Many programs have come to rely on grants as an essential part of their budget resources, and working with a diversity of funders enables program activities to continue uninterrupted when one funding source dries up or shifts focus. Although grant monies are generally available, often those programs most in need of additional funding are those least able to access available resources. Barriers to gaining funding include inexperience with writing grant proposals, lack of awareness that many such funding sources exist, lack of time to research promising grant programs and inadequacy of support and resources to undertake this additional time-consuming responsibility.

Programs that have successfully secured funding through grants have employed a number of tactics ranging from staff members learning to write grants through a process of trial and error to hiring an outside grant writer or participating in a consortium that employs a grant writer. More than two-thirds of the program sites we identified as exemplary have a designated staff member for grant writing, and those that do not tend to team technology coordinators, project directors and other staff together to work on securing funding. Although several successful programs do not have specified grant writers, all programs that had a designated grant writer were successful at landing grant monies.

Examples

SAN MIGUEL MIDDLE SCHOOL:

San Miguel seeks private funding and tuition sponsorship from local businesses. The school principal writes grant proposals, with the assistance of a part-time paid grant writer/consultant who is used on an as-needed basis.

CHICAGO PUBLIC LIBRARY:

AT&T funds the Cyber Navigator program in which college computer science students are employed during the summer to assist patrons and librarians. The library Development and Outreach Director chose to keep AT&T as the sole funder for the Cyber Navigator program and, because of the publicity AT&T received through this initiative, they increased their level of contribution for the following year.

[3] The Universal Service Order was established under the Telecommunications Act of 1996. For more information, visit http://www.sl.universal service.org.

Figure 16

TECHNOLOGY EXPENDITURES: ALL PROGRAMS

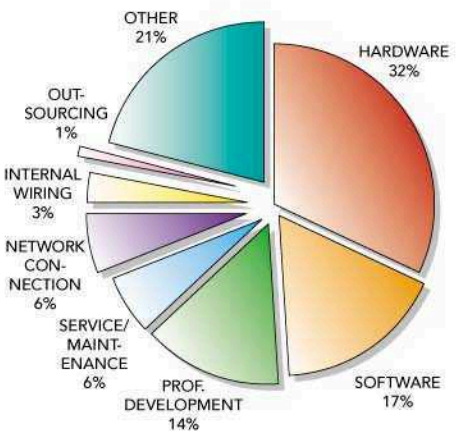
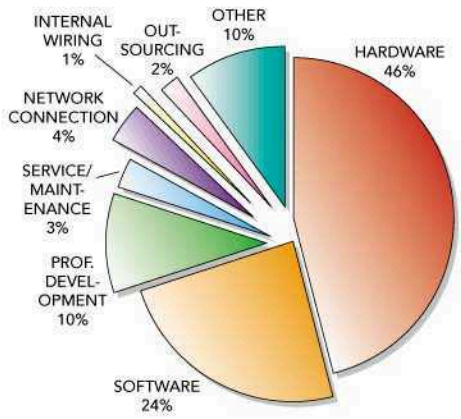


Figure 17

TECHNOLOGY EXPENDITURES: SCHOOLS



MIAMI MUSEUM OF SCIENCE:

Grant writers and development staff have been successful in applying for long-term grants in multiple programmatic areas, each of which supports the overall program focus on youth and science. Two full-time staff members, one from education and one from development, complete the actual grant writing while other staff participate in brainstorming activities. The museum also capitalizes on its existing assets by using facilities, staff and even museum admissions in lieu of grant requirements for in-kind matching of monies.

FUND RAISING

Most technology centers in disadvantaged communities have heavy financial constraints that limit spending on high cost digital technologies. Creating entrepreneurial solutions to achieve sustainable funding may mean relying less on traditional sources of funding (i.e., federal/state programs or grants) and instead utilizing existing capital in new ways. Some solutions include hiring out staff and equipment for business training sessions, renting out rooms for club or organization meetings or even using computer software to create T-shirt designs for a fundraising project.

Examples

STREET-LEVEL YOUTH MEDIA:

Street-Level is exceptional in its ability to fundraise 25% of its total budget. Production contracts with city and state agencies employ youth in art, computer graphics and video production while giving youth real world experience, building résumés and providing income for the program.

THE HAYES FAMILY INVESTMENT CENTER:

The Center hires out their own technology-trained staff members as trainers to private and non-profit organizations.

BUDGET REALLOCATION

Spending decisions often require difficult reallocations of a tight budget, including transferring funds from non-technology related purposes to technol-

ogy-related programs. On average, the programs studied currently spend about 31% of their technology budget on hardware, 17% on software, 17% on service and maintenance, network connections, internal wiring and outsourcing, 14% on staff development and 21% on other budget items such as staffing. Typically less money is needed for software upgrades, maintenance and service once these items are in place. As a result, projections for future expenditures indicate that most of the exemplary programs studied plan to split the majority of their budget between hardware upgrades (48%) and professional staff development (39%). While having hardware already in place gives more mature programs greater flexibility in technology allocations, newer programs may also be able to have some budget flexibility by redirecting monies from other programs to the technology program. For example, schools may use funds allocated for "learning materials" to purchase instructional software, and libraries may use book buying funds to purchase an encyclopedia database. (See Figures 16-19: Technology Expenditures)

Examples

HOMEBASE8:

In order to support the technology program, the superintendent applied to the New York City school district to make amendments to the spending plan. The money needed to build the technology team came from staffing adjustments.

BROOKLYN PUBLIC LIBRARY:

To meet the needs of the technology program some vacant staff positions were moved to the technology department and funds were moved from the book budget to electronic on-line resources.

Figure 18

TECHNOLOGY EXPENDITURES: LIBRARIES

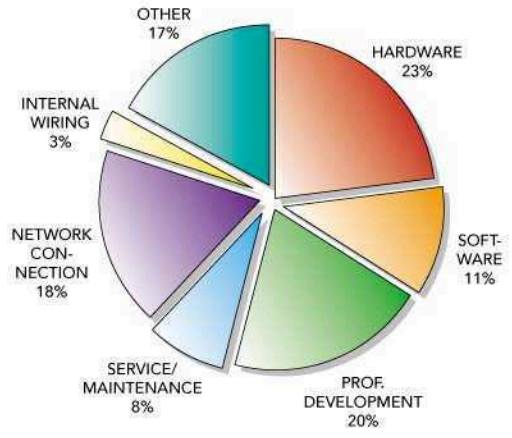
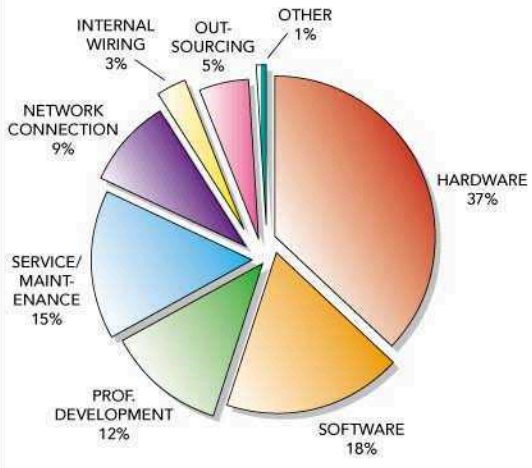


Figure 19

TECHNOLOGY EXPENDITURES: COMMUNITY CENTERS



HAYES FAMILY INVESTMENT CENTER:

Budget allotments for consulting services were reallocated for a new video conferencing facility which generates revenue through fee-for-service.

A lack of collaboration within a school district may impede the progress of individual students who move from schools with advanced telecommunications to schools with limited or no technology resources

Recommendations:

CREATIVE FUNDING

- Diversify sources of funding to ensure a steady stream of support.
- Hire or designate a grant writer to systematically and regularly submit proposals. Alternatively, create a grant-writing team to share experience and the time burden.
- Collaborate with complementary organizations for large grants with shared benefits.
- Hire out hardware, software, building space, production facilities, and trained staff to generate income.

Strategy 4: PARTNERSHIPS AND COLLABORATIONS

A common problem for many information technology programs is that they work in isolation from similar programs unaware of the other's presence, even when they are in the same neighborhood. Working in isolation limits the exchange of ideas and resources, while creating partnerships and collaborations increases a program's network of contacts. The overall benefit of learning from other programs is improvement of services and programs and a decrease in costly mistakes. For schools, a lack of collaboration within a school district may impede the progress of individual students who move from schools with advanced telecommunications to schools with limited or no technology resources. Urban schools are typically part of a larger feeder system with students from several elementary and middle schools feeding into one high school. In some school districts in this study as many as 20–40 percent of the students are highly mobile. Schools that coordinate their technology efforts ensure that students can move between schools and from one grade level to the next with less disruption in their educational progress. As a result, collaboration between schools is a growing phenomenon. Moreover, K–12 schools within the same feeder system can maximize scarce resources by collaborating to receive purchasing discounts on volume purchases of hardware and software, while also ensuring that hardware and software are compatible up and down the feeder stream.

Collaboration and the use of technology help libraries increase their role as a community resource. Library systems tend to be large networks with extensive technologies for cataloguing, research,

and inter-library transfers. Therefore they are ideally situated to be the host organization in partnerships by linking other institutions into their existing network. Both the host library and the partner institution benefit by gaining access to additional resources.

Collaborative efforts are as important for community-based organizations as they are for schools and libraries. Collaboration and sharing of resources often occurs in community centers through an arrangement such as a consortium. A consortium pools resources, such as for grant writing, and each member organization shares in the results. Another partnership practice is to find a friendly "seed" organization that shares the community center's vision and the seed organization offers support by providing staff as volunteer workers, space for training or a location for the program to operate. This type of support enables new organizations to get started and expand before they are fully funded while also benefiting the seed organization by furthering their own vision and goals.

Program leaders usually develop partnerships through personal contact. A significant commitment of time and effort is therefore required to cultivate successful partnerships in the early stages of a technology program. Establishing strong partnerships requires sufficient dialogue between the prospective partners so that both recognize shared values and both have a clear expectation of what each partner gives and receives from the relationship. E-mail is an excellent means of maintaining contact during all stages of the relationship. Joining community organizations such as the Chamber of Commerce or a neighborhood advisory committee can provide instant networks of contacts for a new program and let the community know how an organization is succeeding and what help it needs. Once a program has been established in the community for several years the reputation of the program makes developing partnerships easier. Many leaders of established programs report that they are actually approached by organizations wanting to partner with them.

BUSINESS PARTNERSHIPS

Fostering industry and business relationships to supplement limited budgets is a common solution among successful technology programs. Business partners typically can provide hardware, software, tech support, expertise, volunteers and cash donations. While almost all of the selected programs fostered successful and valuable relationships with the private sector, such success was dependent on keeping the program vision in mind when identifying and soliciting the appropriate corporate partner(s). For example, a community technology center that focuses on job training may initiate a partnership with a local business that has a stake in creating more tech-savvy, and therefore, more employable community members. Partnerships tend to begin with an initial donation of goods, services or funds and as the partner takes an increasing interest in developing a long-term relationship, the partnership may evolve into a sponsorship. Sponsorship provides on-going support that often includes business employees volunteering as tutors and mentors or

providing continuing financial support. Although business partnerships can be a fruitful source of funding and other resources, this approach also requires a grasp of business principles for which some non-profit or public sector leaders may not be prepared. Networking with other local technology programs proved invaluable in teaching the strategies necessary to build relationships with the private sector.

Examples

FOSHAY LEARNING CENTER:

As the leader of a well-funded school, the principal summarized his strategy as, "I never ask for money; I ask for a partnership. What can we do together?"

TECHNOLOGY FOR ALL—HOUSTON:

Partnerships with community organizations are a key to success for Technology For All—Houston. They have helped equip and connect over 50 technology learning centers, leveraging the presence of a broadband network service to access a wide array of educational and training software.

KELLY HIGH SCHOOL:

Many partnerships have grown out of the contacts made in the Kelly Community Council, and their partners become members of the Council. Many contacts are made through the Chicagoland Chamber of Commerce, Rotary Club, calls to industry CEOs, Daley College, and the Principal for a Day program.

CHICAGO PUBLIC LIBRARY:

Partners such as the Chicago Bulls and LaSalle Bank have "adopted" individual branch libraries to support the technology program.

EDUCATIONAL PARTNERSHIPS

Many fruitful partnerships have been forged between colleges and secondary schools or community centers. From these partnerships with institutions of higher learning, schools and community centers can receive volunteers and tutors, training, expertise, equipment, and systems such as distance learning studios and networks. In return, the college and university students who participate receive real world experience.

Examples

NORTHBROOK MIDDLE SCHOOL:

Through a partnership with the University of Texas Health Sciences Center, Northbrook students in Wellness and Physical Fitness classes receive health information from experts in the field. At the same time, the program helps students gain awareness about career opportunities in the medical sciences and eliminates the misperception that only physicians and nurses work in this field.

RIVERSIDE PUBLIC LIBRARY
—EASTSIDE CYBRARY CONNECTION:

Partnerships with the University of California, Riverside and Riverside Community College provide college students as on-site homework tutors at the Cybrary. In return, the university students receive class credit and the community college students receive work-study money for hours volunteered.

STREET-LEVEL YOUTH MEDIA:

Partnerships with local schools have been successful in two ways. First, Street-Level offers on-site homework tutoring and group classes for students who come to the center. Second, presentations about Street-Level programs are made in local classrooms after an orientation program acquaints teachers with the technology prior to the presentation.

TOWN PARK NEIGHBORHOOD NETWORK CENTER:

The Living Right program is the result of a partnership with the University of Miami to offer nutrition classes and asthma prevention and awareness materials to Town Park residents.

COMMUNICATION TECHNOLOGY

Use of information technologies such as e-mail, teleconferencing, and the Internet can help increase collaboration by improving the frequency and quality of communication between staff and partners outside the organization. E-mail is used to maintain contact with partners, funders, and professional organizations. Most staff that use e-mail report that they could not function without it because it improves the speed and amount of communication between individuals. Furthermore, much information is available on-line. Information sharing maximizes successful practices and reduces the risk of repeating costly mistakes. This is especially important for programs in communities with few resources to spare.

Examples

RIVIERA MIDDLE SCHOOL:

A partnership with Coca-Cola allows company employees to serve as on-line mentors to Riviera students.

QUEENS BOROUGH PUBLIC LIBRARY:

E-mail communication between administrators at the library and partner organizations, such as the New York Academy of Medicine, was used to establish the procedures linking the organizations. The library provides the technology for terminals and software and, in return, library customers can link to the partners for information.

HARAMBEE CHRISTIAN FAMILY CENTER:

The Co-Director uses e-mail for fundraising, allowing him to communicate easily with donors and others he would otherwise not be able to reach.

Recommendations: PARTNERSHIPS AND COLLABORATIONS

- Standardize technology—software, hardware and curricula—between schools in a district to avoid impeding student progress.
- Join a consortium to leverage a program's unique skills for the mutual benefit of all consortium members.
- Network; let the community know how your organization is succeeding and what assistance you need.
- Take the time to establish effective partnerships. Have sufficient dialogue between prospective partners so that both recognize shared values and have a clear understanding of the value each partner gives and receives from the relationship.
- Draw on students at local universities and colleges to volunteer as tutors and mentors in exchange for practical experience.
- Develop relationships with business partners with an eye toward long-term sponsorship.
- Keep partnerships active; review the value of the partnership against the cost and effort.

Strategy 5: STAFF DEVELOPMENT

In schools, computers are increasingly regarded as a learning tool rather than a panacea for all educational concerns, yet the exact role of technology in the classroom is often unclear. Several technology coordinators and teachers voiced their firm belief in the ability of computer technology to motivate students to apply themselves unlike any other feature of their academic program, while others protested strongly that "it's the staff, not the boxes" (referring to the computers). Recognizing the important balance of both technology and teachers working together to engage students, all programs that were studied have abandoned the didactic "drill-and-practice" approach to learning in favor of project-based learning that integrates technology into the curriculum at many levels to enhance a diverse learning environment. While up-to-date technology and relevant content are necessary, a staff capable of integrating technology into the curriculum and presenting it to students, customers, or clients is an essential component of any successful technology program.

> Ongoing technology training is important to accomodate frequent hardware and software upgrades, changing user needs and personnel turnover

Staff development is essential to the sustainability of a technology-based organization, and thus its ability to achieve its goals. Survey respondents universally agreed that when staff development was lacking, technology was underutilized. Therefore, ongoing technology training is important to accommodate frequent hardware and software upgrades, changing user needs and personnel turnover. Clarifying the organization's vision is also an important part of staff development. E-mail has a special application in staff development by providing staff with opportunities for increased frequency and quality of communication. Using e-mail, staff are able to maintain professional contacts outside of the organization and stay current on relevant issues and policies through discussion groups. Increasing collaboration through teamwork and building leadership skills also enhances staff buy-in to the program and ultimately contributes to program sustainability. Best practices that support staff development are continually enhancing computer literacy, limiting staff turnover, and involving staff in decision-making processes.

Best Practices

COMPUTER LITERACY

Developing a high degree of computer literacy among staff members is a priority because technology cannot be fully utilized unless there are qualified staff available to train and assist users. Technology coordinators at all programs indicate that, on average, nearly two-thirds of all staff hired within the past two years have intermediate or advanced computer knowledge. Increasingly,

Figure 20

STAFF COMPUTER LITERACY AT TIME OF HIRE

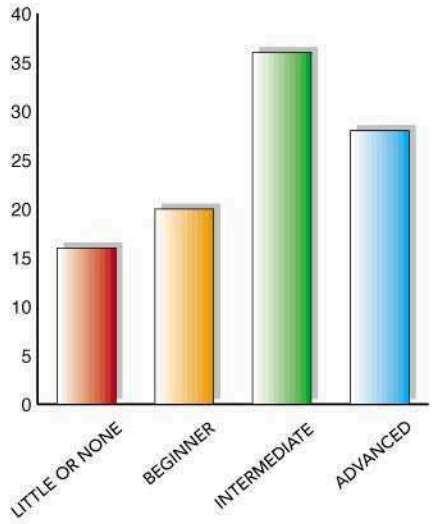
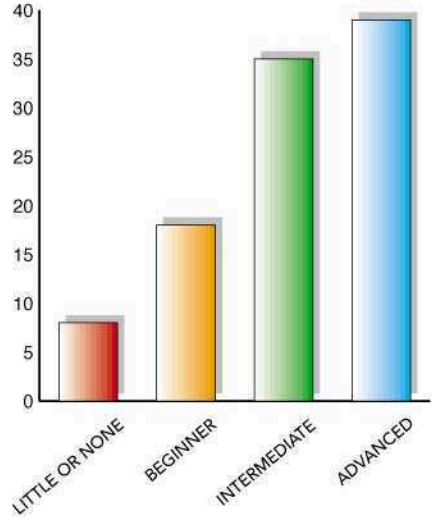


Figure 21

STAFF COMPUTER LITERACY CURRENTLY



schools are adopting minimum technology skill requirements for new teachers, and schools, libraries and community centers are all working to upgrade the computer literacy of new hires through ongoing training. About 90% of the programs in this study have implemented staff development and training to upgrade the computer literacy of current staff. These training programs seem to be effective, with the level of computer literacy for 74% of current staff rated as intermediate or advanced. (See Figures 20-21: Staff Computer Literacy)

Examples

SPRING BRANCH SCHOOL DISTRICT:

Ongoing training is accomplished by several methods: 1) clear standards of literacy appropriate to each job; 2) self-assessment programs attached to learning modules; and 3) self-study or peer-taught programs based upon standards of competency.

CHICAGO PUBLIC LIBRARY —CYBER NAVIGATORS:

During the recruitment process, the Cyber Navigator Project Director concentrates on determining how well Cyber Navigator candidates translate their computer and network knowledge to others. Some of the most advanced candidates could not adequately explain information in a simple, straightforward manner. For that reason, trainable candidates with lower computer skills and higher people skills may be more suitable for a position.

BRESEE FOUNDATION CYBERHOOD:

The Technology Team offers quarterly technology training for all staff who do not work directly with Bresee clients. Training has included technology applications such as e-mail, advanced MS Word, PowerPoint and File Maker Pro, as well as other classes based on staff input. The Technology Team receives their training either on the outside, as needed, or from an Apple Educational Consultant who goes to the center every other month to maintain the system and provide training.

STAFF TURNOVER

More than half of the programs studied experience low staff turnover, a significant factor in their ability to provide qualified and experienced staff. Loss of expertise is a common result of staff turnover and, despite the low turnover rate, loss of staff may be felt severely, depending upon the position vacated. The level of impact depends on the degree of technology expertise lost, how difficult it is to regain or replace, and the size and fiscal health of the organization. For programs in the process of integrating technology into their curriculum loss of key staff, such as a technology coordinator, can dramatically slow the process. However, those programs that have a high proportion of staff already using technology are not as greatly affected by staff turnover. The ability to maintain a low rate of staff turnover can be attributed to many factors, including staff commitment to program goals, competitive salaries and, in some cases, contractual obligations.

Examples

HOMEBASE8:

A low turnover rate is all the more dramatic given that HomeBase8 is located in the South Bronx, a community with high poverty. Reasons for the low rate of staff turnover include 1) the staff are committed; 2) they love children; and 3) they believe that technology has the potential to make a difference in this community.

QUEENS BOROUGH PUBLIC LIBRARY:

Staff turnover has little effect upon the operation of the technology program because of the relatively large number of trained staff. To prevent trained key people from accepting better paying positions in the private sector, the library prioritizes offering competitive salaries.

> Staff involvement in decisions regarding planning, purchasing, tech support and training increases buy-in, commitment and, ultimately, long-term sustainability

CHARLES HAYES FAMILY INVESTMENT CENTER:

Because the Hayes Center provides extensive—and costly—training for new hires, they obtain two-year legal commitments to stay with the organization from trainees.

DECISION MAKING PROCESS

Increasing staff involvement in the decision making process can enhance buy-in to the program and thus, willingness to participate in training. Although final decisions with regard to hardware and software purchases may rest with the principal or executive director of a program, most programs make such decisions based on the recommendations of a technology committee composed of staff and, in some cases, students, parents or community members. Staff involvement in decisions regard-

ing planning, purchasing, tech support and training increases buy-in, commitment and, ultimately, long-term sustainability.

Examples

JORDAN HIGH SCHOOL:

The principal signs off on hardware and software purchase requests but defers to recommendations from the two technology coordinators. A technology committee composed of faculty members from different departments, parents and the administration also have input.

QUEENS BOROUGH PUBLIC LIBRARY:

Hardware and software decisions are arrived at through the consensus of department heads, directors and technology staff. Final recommendations go to the Director of Finance and Information Systems who checks them for standardization. The Board of Trustees awards final bids.

BRESEE FOUNDATION CYBERHOOD:

The Executive Director makes the final hardware acquisition choices with the Technology and Employment Program Director's assistance. Input comes from staff who will use the new hardware, as well as an Apple consultant, and the technology staff. The Executive Director lets the Technology and Employment Program Director make the software decisions as long as she meets her objectives and funds are available. Input comes from anyone who will be utilizing the software.

Recommendations: STAFF DEVELOPMENT

- Establish computer literacy standards appropriate to each staff position and consider making minimum computer literacy standards a part of the hiring process.
- Offer continuous training to keep staff current on hardware and software developments and to alleviate problems when key people leave.
- Minimize staff turnover by fostering staff commitment to the organization's vision during training.
- Assign staff to strategic planning and action teams; include staff recommendations for purchases of hardware and software.

Strategy 6: INTEGRATION OF TECHNOLOGY

The ability to provide effective access to technology depends on having a well-trained staff that is not only proficient in technology, but in integrating technology into the program curricula. Over 80% of schools report that technology has been successfully integrated into the program curricula. Staff development can be crucial to the success of integrating technology into the curricula and this requires getting the staff to commit to technology as an integral component of education and learning. How technology is specifically integrated into the curricula of a program depends on program goals and objectives. Technology integration may include teaching keyboarding, spreadsheet and multimedia

production skills in a community center that is geared towards job training or it may mean developing project-based learning to incorporate research, writing, creative and critical thinking skills in a school classroom. Best practices for integrating technology into the program include staff training, having a technology plan, making technology easily available, assessing the ability of the program to meet user needs, and taking advantage of advances in website design and deployment.

Best Practices

STAFF TRAINING IN TECHNOLOGY INTEGRATION

Librarians are generally the most digitally literate staff in our study since their educational training specifically prepares them to understand and manipulate information systems. Many teacher-training programs at universities are following suit by requiring courses on how to integrate technology into the curriculum; however, such training is not mandatory in all states. While university-level training programs make recently graduated staff more proficient in integrating technology into program curricula, they do nothing to eliminate the disparity between these recently graduated and older staff. Therefore, it is important that all staff recognizes the benefits of technology and is trained to effectively integrate technology into the curriculum. Such training requires a time commitment from staff as well as financial support that may not be readily available. Despite their exemplary characteristics in several areas, some programs have, at best, informal professional development programs because of limited funding. Yet, many successful programs have extensive in-house training with technical expertise readily available both for staff and end users. Tech support is essential to technology integration because staff will be frustrated and less inclined to use unreliable equipment.

Examples

HOGG MIDDLE SCHOOL:

Teachers receive technology training to help them meet set expectations about technology proficiency. Hogg relies on two approaches: 1) Instruction provided by district personnel and 2) computer based instruction (CBI) provided by the district. Individuals appear to like the flexibility of the CBI.

CHICAGO PUBLIC LIBRARY —CYBER NAVIGATORS:

Frequent staff training is available for the regular library staff, and the Cyber Navigators receive one intensive week of training upon entering the program. The training is about 2/3 user-centered and about 1/3 staff-centered.

ERIE NEIGHBORHOOD HOUSE:

Professional development is a budget line item, with $800–$1000 allotted per person each year. The Associate Executive Director believes in hiring educators first and technologists second. New hires at Erie are required to have a specified level of proficiency.

TECHNOLOGY PLAN

Developing a technology plan appears to help the process of integrating technology into the curricula. As discussed earlier, technology plans establish procedures for implementation, set goals, and clarify the intended use of technology. Planning to standardize operating systems and software is a way of removing barriers to technology integration.

Examples

SPRING BRANCH SCHOOL DISTRICT:

Spring Branch is standardizing all of their computers and software. To support the infrastructure and hasten integration of new technology, they deploy a

full-time technology support person to each high school and to Northbrook Middle School. Elementary schools and all other middle schools share a technology support staff member.

QUEENS BOROUGH PUBLIC LIBRARY:

Leadership teams meet weekly, year round, to review and revise the technology plan which includes 30 short-term, goal-directed strategies. Currently there are leadership teams for each strategy. Teams perform goal analysis and develop sets of recommendations.

CHARLES HAYES FAMILY INVESTMENT CENTER:

Technology has changed since the Hayes Center first opened, requiring them to develop a new technology plan. The new plan helps to identify goals for teaching technology-oriented employment skills and keeps those goals focused.

MAKING TECHNOLOGY AVAILABLE

One problem that all programs face in creating access to information technology is availability. To effectively integrate technology into the curriculum it must be available for users. In an ideal world, users would be able to visit a school, library or community center whenever they wanted and find an available computer. However, budgetary, staffing and scheduling constraints are a reality for non-profit and public organizations. As a result, almost half of the programs in the study reported that users generally face waiting periods to access a computer. However, in the majority of cases the wait was less than 15 minutes and at no site was the wait reported to be more than one hour. This is significant because availability is closely linked to the value the user places on the computer resources. For example, among students who felt that it was very important that the school provide computers for their use, 63% indicated that they usually did not have to wait to access a computer. By comparison, only 36% of those who faced a wait felt that school computer resources were important.

To reduce the problem of availability each program has in place a system for managing demand. Some programs use a waiting list sign-up sheet, at others access is on a strictly first-come first-serve basis, and a few impose time limits for use during the busiest hours. Schools that do not have adequate space for many computers in individual classrooms have increased access by creating computer labs, sponsoring computer clubs, offering interested students the opportunity to practice troubleshooting and maintenance through computer tech squads, and even promoting computer access at home by loaning or renting computers.

Examples

HOGG MIDDLE SCHOOL:

During school hours, students can access computers in the classroom as well as in the library and specialized laboratories. Users may also access the Internet and use computers in the library (30 minutes maximum time) through workstations deployed by the school, and through a library-housed laboratory installed by a private corporation. Computers are being taken out of some of the classrooms and put into laboratories for development of curricular projects that include technology components. Community members have access to the same facilities for four hours on Saturdays.

CHICAGO PUBLIC LIBRARY —CYBER NAVIGATORS:

Cyber Navigators are computer science students employed during the summer. Lacking space in public areas to conduct classes for patrons, the library developed the novel solution of Cyber

Teaching program participants to design and maintain the website not only teaches marketable skills, but also helps the program to meet its need of keeping the website up to date

Navigators who assist patrons on a one-on-one basis at every library location. Their presence maximizes the utility of the space by helping to keep computers operating and librarians free to do reference work.

ERIE NEIGHBORHOOD HOUSE:

Computer facilities are available 46–60 hours per week and also on weekends for classes, and use is first-come first-serve. The problem of long wait periods was eliminated when computers were moved out of one center and distributed throughout the building.

ASSESSMENT

Integrating technology into the curriculum can best be achieved by formally assessing user needs and then developing strategies to meet those specific needs. Typically, assessment of user needs was done after the fact for the programs in this study and even the concept of "meeting user needs" was interpreted differently at each program. At some programs, evidence that the needs of users were being met was demonstrated by a high demand for the program's services, yet at other programs, high demand indicated the need for more hardware or software. Finally, graduates going on to college or getting jobs represent a degree of evidence that the needs of users who stay with the program are being met.

Only about half of the programs have a method in place for evaluating the success of their technology program. In schools the use of technology is typically evaluated based upon the quality of student writing, presentations and project-based learning products, improved standardized achievement scores, the number of students graduating and students gaining employment or enrolling in college. Based upon their own assessments, four out of the 10 schools studied felt that they did not have enough computers to meet user needs, but only one of those four felt that the software did not meet user needs. At libraries and community centers evaluation of the technology program is based upon both observations by staff and surveys of users. For example, participants may be surveyed at periodic intervals, evaluations filled out at the end of each training class or tallies kept on computer usage.

Examples

FOSHAY LEARNING CENTER:

To determine user needs, Foshay surveys the community in which students live, uses testing to identify student skill level, and devises programs to aid student progress.

RIVERSIDE PUBLIC LIBRARY
—EASTSIDE CYBRARY CONNECTION:

Prior to establishing the Cybrary the library director determined community needs by seeking input from ministers in Black and Hispanic neighborhood

churches, principals of area elementary schools, and the Eastside Neighborhood Advisory Committee. Representatives from multiple agencies formed the Eastside Cybrary Connection Advisory Committee during the needs assessment process and project concept development.

BRESEE FOUNDATION CYBERHOOD:

After every class all participants complete an evaluation form and surveys are conducted among community members who use the Cyberhood resources. Bresee is exceptional in that they maintain a database to track the progress of program participants including the achievements and evaluations of everyone who uses the center.

WEBSITES

Websites can be used to facilitate the integration of technology in teaching program participants the practical skills of building and maintaining program web pages. Almost every selected program has a website; however, due to the lack of staff, only three-quarters of these programs have a mechanism to keep the website up to date. Teaching program participants to design and maintain the website not only teaches marketable skills, but also helps the program to meet its need of keeping the website up to date.

Examples

JOSE CLEMENTE OROZCO ACADEMY:

A web team of 7th and 8th grade students, as part of the "technology experts" program, meets twice a week to work on the website. The Media Specialist/Technology Coordinator and Tech Support staff administer the technology experts program. Students meet for one class per month to learn troubleshooting and software and they help other students and teachers.

BROOKLYN PUBLIC LIBRARY:

The library has used its network and web technology to create a "knowledge network" that links users with the resources of other Brooklyn institutions such as the Children's Museum and the Botanical Gardens.

HARAMBEE CHRISTIAN FAMILY CENTER:

The website is continually updated by the co-Director and students who maintain it. Harambee receives considerable corporate and business community support for the website: SYV.com has been the website host since 1996 and Earthlink and Charter Communications sponsor the Harambee Internet Lab.

Recommendations:
INTEGRATION OF TECHNOLOGY

- Institute procedures for assessing staff training needs and administer regular training as technology changes or new personnel are hired.

- Keep technology and/or strategic plans up to date through regular review so that they function as yardsticks for measuring outcomes. As part of this procedure, reexamine the organizational vision to see if major goals were accomplished or perform a program evaluation to estimate the success of the organization in meeting the needs of its clients.

- Create multiple opportunities for users to access computers through labs, classrooms, clubs or home loan programs. Have tech support available to provide maximum access to limited technology. Train students or patrons to serve as technology trainers or to maintain IT systems. Once trained, students and patrons benefit by having employable skills.

- Continually assess user needs through surveys, class evaluation forms, staff observation, tallies on computer usage, etc. in order to identify how well the organization is accomplishing its mission.

- Use the program website as an opportunity to teach marketable skills of web design and maintenance to program participants.

V. FEEDBACK FROM END USERS

Individuals participating in the programs in this study were surveyed in order to assess whether the public access technology programs in schools, libraries and community centers were meeting the needs of their communities. In general, students, library patrons and community members alike agreed that one of the primary advantages of using the computer resources at their program site was the availability of classes. Nearly 90% of the programs in this study offer specific classes on a regular basis to train users, with the majority of classes offered daily or weekly. More importantly, all of the programs have staff available to assist or train users with the computer resources. End users felt that classes provide several benefits: first, classes teach employable skills that can lead to better job opportunities; second, exposure to information technology increases comfort and confidence in using a computer, and third, classes teach many basic skills such as navigating the Internet, using e-mail and even typing, which prepares one for more complex skills. Clearly, learning basic skills created an interest in learning more because end users were anxious to follow-up introductory level classes with more advanced classes such as programming and multimedia. When asked what they liked most about the computer resources at their program site, the common answers at all program types were 1) the availability of classes, 2) personalized instruction, 3) selection of software, and 4) fast connections to the Internet. When asked what they liked least about their program's computer resources, end users indicated that although they are generally satisfied with the program they want more of the services currently available—more computers, more software, more hours of service, more classes, etc.

Students, library patrons and community members alike agreed that one of the primary advantages of using the computer resources at their program site was the availability of classes

SCHOOLS

Respondents surveyed at schools were more likely to be male (57%) than female (41%), predominantly Latino (80%), and nearly half bilingual in Spanish and English (48%).

Figure 22

LOCATION WHERE STUDENTS FIRST LEARNED TO USE A COMPUTER

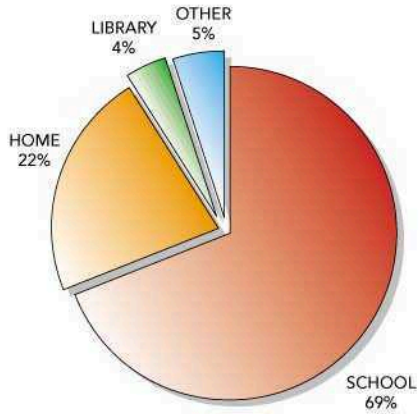
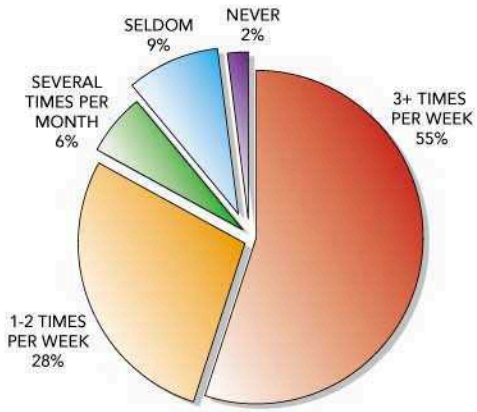


Figure 23

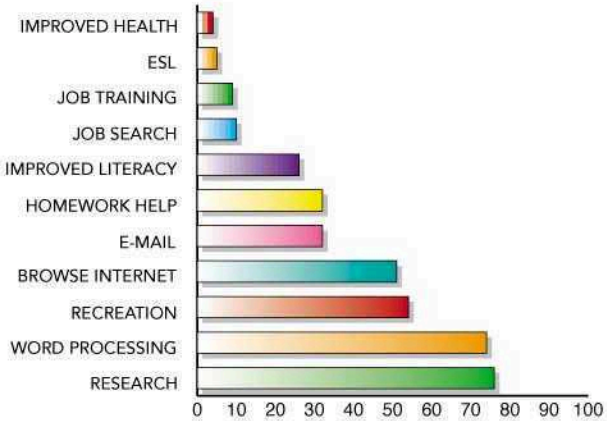
STUDENT FREQUENCY OF USE OF COMPUTER RESOURCES



More than two-thirds of students surveyed indicated that they first learned to use a computer at school. For students who do not have a computer at home, school technology resources play an even more important role, with 84% first learning to use a computer at school. Although 60% of students reported that they have a computer at home, one-third of students with a home computer do not have Internet access. About 61% of students responded that they find the computer classes offered at their school interesting. Among those students who agree that the computer classes are interesting, nearly 75% state that it is very important to them that the school provided computer resources for their use. However, among students who feel that the available computer classes are not interesting, only 53% state that it is very important that the school provided computer resources for their use. Clearly, the availability of interesting and relevant classes can help to reinforce the value of computers to students. (See Figure 22: Location Where Students First Learned to Use a Computer)

Figure 24

APPLICATIONS OF COMPUTER RESOURCES: SCHOOLS



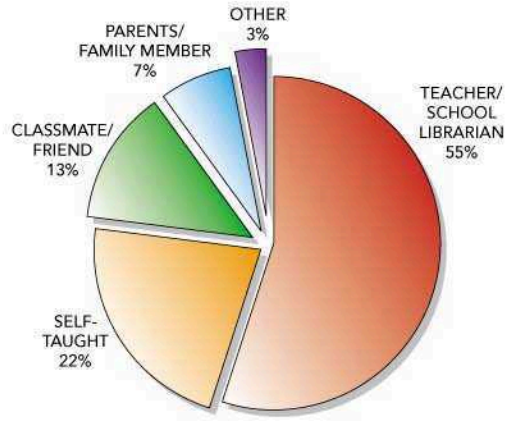
Over half of students use school computers three or more days a week; an additional quarter of the students use them at least once a week and fewer than 10% indicate that they seldom use computers at school. Further, students reported

that they stay engaged with computers once they start using them, with two out of three typically using the computer for more than 30 minutes at a time. However, many students—just under half—also use the computers on their own time outside of specific class time. (See Figure 23: Student Frequency of Use of Computer Resources)

When asked if they had enough access to computers, 40% of students felt they did, 21% responded 'no' and the remainder was unsure. With such large demand and student interest, it is interesting that the schools are able to provide sufficient access to so many students. Nearly two-thirds of students reported that when they want to use a computer there is no wait, and when there is a wait it is usually less than 15 minutes. Waiting to access a computer did not seem to affect whether or not a student values a computer. Nearly 78% of all students stated that today computers are very important in general, and about two-thirds felt that it was important that the school provided computers for their use. These numbers were consistent even among those students who usually had to wait to use a computer. Furthermore, the majority of black and Latino students agreed that it was important that the school provided computers for their use (84% and 68% respectively) compared to less than one-third of white students. Seventy percent of students also agreed with the statement that computers make their courses and school work more interesting and 56% of students felt that computers help them do better on their schoolwork.

Figure 25

WHO STUDENTS RELY ON FOR COMPUTER TRAINING



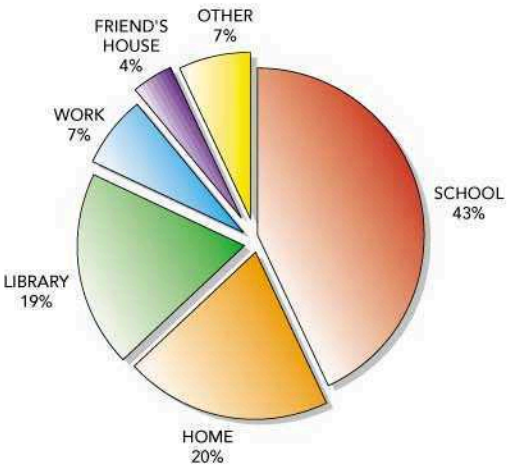
Finally, students who felt that computers helped them in their schoolwork were more than three times as likely to feel that it was very important that the school provide computers for their use than were those students that disagreed with this statement.

Students reported a greater use of technology resources for information gathering and research than either library or community center respondents. The number one use of computers was to search for and gather information (76%), followed closely by word processing (74%), games/recreation (54%) and browsing the Internet (51%). Other popular uses of computers were e-mail (32%), help with homework (32%) and improved reading and writing skills (26%). Some students reported using computers for job searches (10%), job training (9%), ESL skills (5%) and health care needs (4%). (See Figure 24: Applications of Computer Resources: Schools)

Over half of the respondents stated that they receive most of their computer instruction from their teachers at school, while approximately 22% feel comfortable learning on their own. However, when asked if they receive enough help with their computer questions, one out of four students answered 'no.' Computers and the Internet are bringing new opportunities to low-income students, with nearly two out of three indicating that they have developed new and useful skills since using the computers in their schools. Finally, three-fourths

Figure 26

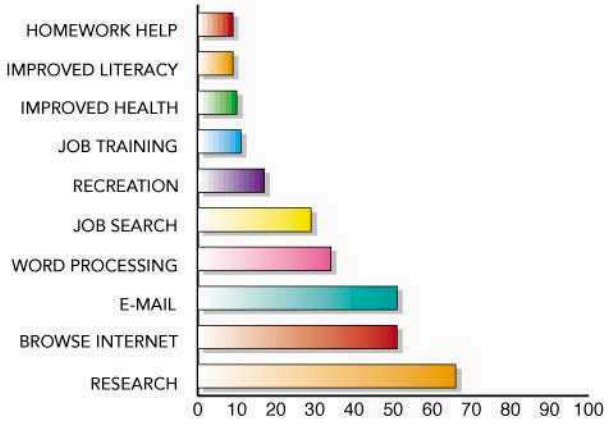
LOCATION WHERE LIBRARY PATRONS FIRST LEARNED TO USE A COMPUTER



of students are satisfied with the computer resources at their schools, and over two-thirds would recommend to a friend or classmate using the information technology resources on hand. While some students felt there was room for improvement, virtually all students were satisfied with the computers resources at their school. (See Figure 25: Who Students Rely on for Computer Training)

Figure 27

APPLICATIONS OF COMPUTER RESOURCES: LIBRARIES



LIBRARIES

Survey respondents at libraries are slightly more likely to be female (50% vs. 47% male); diverse in age (47% are under the age of 25; 26% are between 26 and 45; and, 25% are over 46); diverse in income (38% have an annual family income below $25,000; 21% between $25,000 and $50,000; and, 22% over $50,000); diverse in ethnicity (31% are White; 20% Latino; and, 20% Black); and likely to be neighborhood residents: 75% travel less than 2 miles to use the library.

Among all library patrons that use technology resources at the libraries surveyed, 43% first learned to use a computer at school, while for 19% the public library was their first exposure to information technology. For those library patrons who lacked access to a computer at home, this increased to 27% who first learned to use a computer at the library. While nearly three out of five users indicated that they had access to a PC at home, less than half had Internet access. Interestingly, over half of the respondents stated that they use the library computer resources to browse the Internet, regardless of whether they had the Internet at home. Clearly, public libraries provide a supplementary point of access for advanced technologies that people do not have in their home and offer high-speed access that is often superior to the technology in the home. (See Figure 26: Location Where Library Patrons First Learned to Use a Computer)

Library patrons overwhelmingly agreed on the importance of information technology in today's world, with 97% stating that in general computers are important. Further, 92% felt that it is important that libraries provide public access to computers and the Internet. The number one use of information technology at libraries was searching for information (66%), followed

Figure 28

LIBRARY PATRONS USING COMPUTER RESOURCES 3 OR MORE TIME PER WEEK: BY AGE

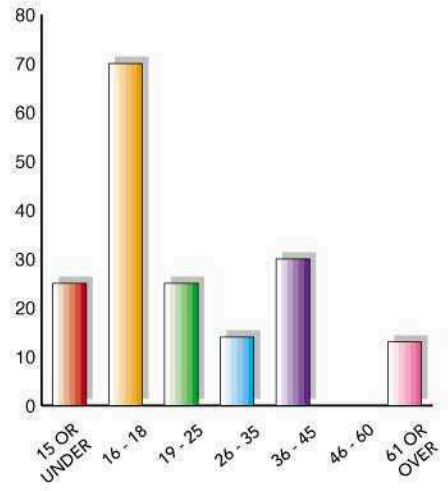
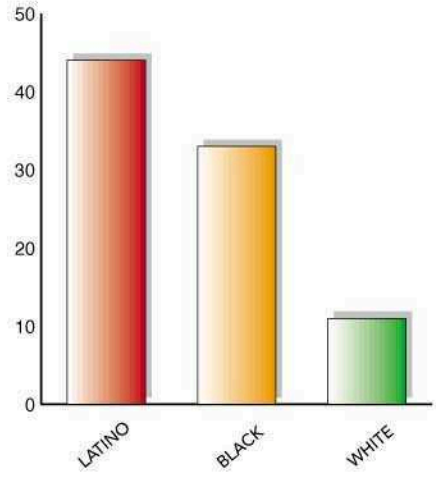


Figure 29

LIBRARY PATRONS USING COMPUTER RESOURCES 3 OR MORE TIME PER WEEK: BY ETHNICITY



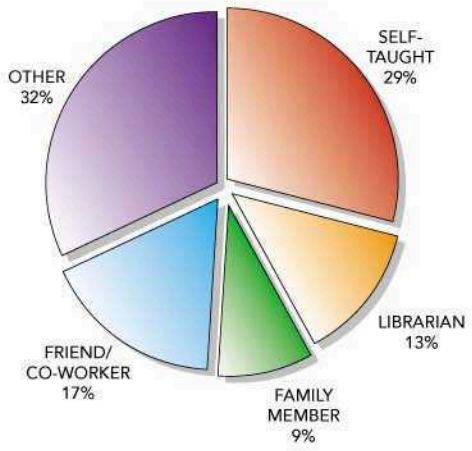
by browsing the Internet (51%) and using e-mail (51%). Using a computer for word processing was the fourth (34%) most likely use. Other uses included job searches (29%), games/recreation (16%), and homework, job training, health care and improved writing skills, each at about 10%. (See Figure 27: Applications of Computer Resources: Libraries)

three or more times per week, compared to only 13% of senior citizens. Further, 44% of Latinos used the library computers three or more times per week, compared to 33% of blacks and 11% of whites. While demand forces many libraries to restrict patrons total time on-line, more than half of the library respondents were able to access a computer for at least 45 minutes at a time. Three out of five users indicated that they usually have to wait to use a computer at the library, although few had to wait more than 30 minutes to gain access. All in all, two-thirds of those surveyed felt that the library maintained adequate hours for access to computers and the Internet. (See Figure 28-29: Library Patrons Using Computer Resources Three or More Times per Week)

Forty-three percent of respondents indicated that their library offers interesting computer classes and that they use the library information technology resources more than once a week. Interestingly, both age and ethnicity were significant factors in determining how often patrons accessed library technology resources. Seventy percent of youth age 16–18 reported using the computers

Figure 30

WHO LIBRARY PATRONS RELY ON FOR COMPUTER TRAINING



Among their many tasks, librarians are important providers of technology training and assistance to patrons. Thirty percent of technology users indicate that the librarian is the single most important person in this regard. Interestingly, users at the library were the most independent as well, with 32% reporting that they are self-taught when it comes to computers. In addition, most of the users feel that the library staff provides adequate technical support and training for their needs. The training and support is evident in that over 60% of the users reported that they have developed new computer skills since they began using the technology at the library. In sum, 87% of the users of the public library information technology resources are satisfied with what the library offers and 93% would recommend using the resources to a friend. (See Figure 30: Who Library Patrons Rely on for Computer Training)

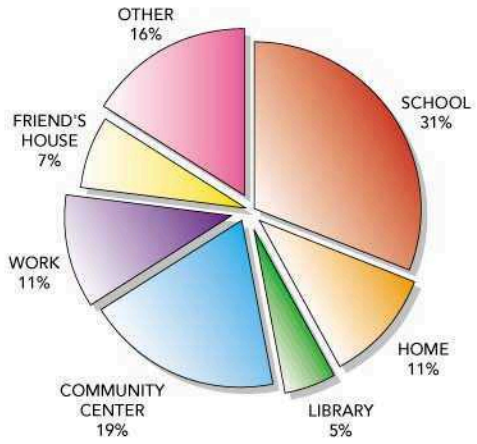
COMMUNITY CENTERS

End users at community centers in this study are more likely female (57%) than male (38%), predominantly black (58%), mostly young (55% are under age 25), and likely to have a family income below $25,000 (55%).

Since the majority of computer users at community centers are young, it is not surprising that 31% first learned to use a computer at school. However, for 20% of users, the community center is their first exposure to information technology. Community center patrons tended to have lower rates of computer ownership at home than either students or library patrons, with just two out of five indicating that they own a PC. Of those with computers at home only 25% had Internet access. Thus, community centers are providing an important point of public access within low-income communities. The lack of computers at home

Figure 31

LOCATION WHERE COMMUNITY CENTER PATRONS FIRST LEARNED TO USE A COMPUTER



make it all the more significant that 84% of respondents felt that interesting computer classes were available through the community center.

Patrons who visit community centers to use information technology resources do so frequently. Sixty-three percent indicated that they use computers at the community center three or more days per week and fully 80% use the computers at least once a week. Once at the center, users tended to stay on-line for over an hour. Frequency and duration of computer use may be a function of the kinds of classes and project-based programs community centers offer. Unlike the libraries surveyed, age and ethnicity were not determinants of how often a person was likely to access computer resources; however, income was a factor. Of those respondents reporting an income of less than $15,000 per year, 39% used the computers three or more times per week compared to only 15% of those earning $15,000–$25,000 per year. (See Figure 31: Location: Where Community Center Patrons Learned to Use a Computer)

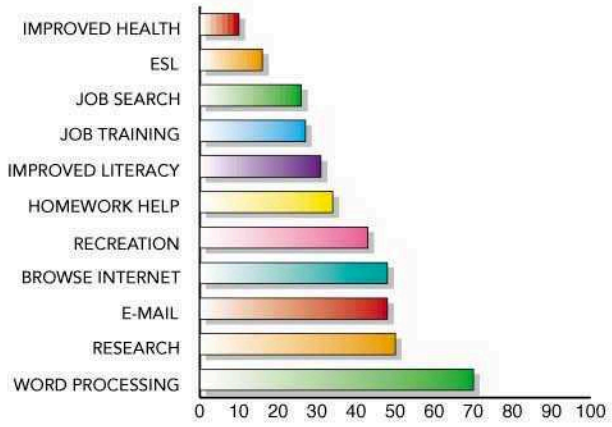
When asked if the computer facilities at the community center were adequately accessible, nearly three out of four people agreed and only 16% thought more hours were necessary. Given that community centers are typically smaller than libraries and schools it might be expected that a user would have to wait for access to a computer. However, only 15% of respondents stated that they usually have to wait, and in those cases the wait was almost always less than 30 minutes.

Community centers offer a wide variety of programs and courses for computers and the Internet. While schools and libraries concentrated on information gathering activities, users at community centers had other needs. The number one use of computers was for word processing (70%), followed by searching for and gathering information (50%), e-mail (48%) and browsing the Internet (48%). Other popular uses of computers were for recreation (43%), help with homework (34%) and improving reading and writing skills (31%). Work and job related uses were also reported, with over a quarter of respondents using computers for job training and an additional quarter for job searches. Although lower on the list, some people used the technology for improving ESL skills (16%) and health care needs (10%). Over 80% of community center patrons reported that they had developed new skills since beginning to use computers at the center. (See Figure 32: Applications of Computer Resources: Community Centers)

The staff at the community center is also very valuable in the end users' overall experience. Over half of the respondents reported that a staff member at the community center was the primary person that helped them with their computer skills, followed by teachers at 16%. Interestingly, while only 20% of the users first learned to use a computer at a community center, over half feel that they get most of their

Figure 32

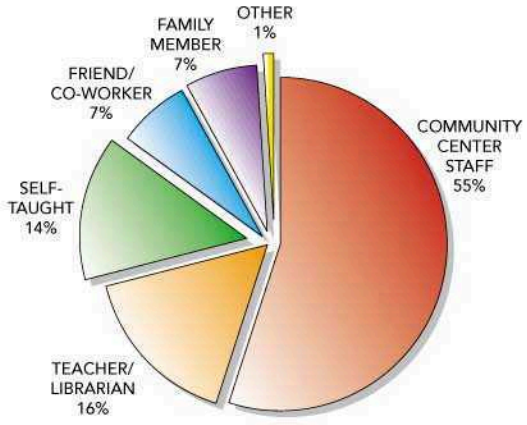
APPLICATIONS OF COMPUTER RESOURCES: COMMUNITY CENTERS



instruction and guidance from community center staff. Further, nearly nine out of ten users are satisfied with the level of support they receive at the center. Over 90% of the users are satisfied with the technology and would recommend using the facilities to a friend or relative. (See Figure 33: Who Community Center Patrons Rely on for Computer Training)

Figure 33

WHO COMMUNITY CENTER PATRONS RELY ON FOR COMPUTER TRAINING



Finally, we found that while half of all technology users at community centers lived less than one mile from their facility, almost one quarter visited from over five miles away. It is clear that these exemplary community centers are effectively attracting community members to their technology resources. The importance of computers in the 21st century is well recognized by respondents, with 98% stating that in general computers are important in today's society, and 92% responding that it was important to have access to computers at community centers in their neighborhoods.

VI. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

It is now widely accepted that in our information-based society, digital literacy is becoming a prerequisite for full participation. Sixty percent of all newly created jobs now require network skills and those who have computer skills already earn 10–15% more than those who do not. Moreover, according to the Bureau of Labor Statistics, the five fastest growing careers are in computer-related fields, and they offer a higher than average earning potential (Fullerton, 1999). Clearly, anyone who does not have computer skills is at a competitive disadvantage for the best paying jobs. Based on this snapshot of our workforce needs, addressing the gap between the information "haves" and "have nots" becomes a compelling mandate.

Despite the importance of access to network technologies, Hispanics still lag behind in computer and Internet connectivity. The gap in home Internet access rates for Hispanics, compared to the national average, increased between 1998 and 2000. In August 2000 the Internet penetration rate for Hispanic households was 23.6%, 17.9 points less than the national rate and 4.3 points higher than the gap in 1998 (NTIA, 2000). Furthermore, data from the National Center for Education Statistics indicate that computer and Internet availability is not equally distributed among the nation's public schools. In 2000, 85% of classrooms in schools with a minority enrollment of less than 6% had Internet access and a low student-to-instructional computer ratio of 6 to 1. By comparison, only 64% of classrooms in schools with a minority enrollment of 50% or more had Internet access and the student-to-instructional computer ratio was higher at 8 to1 (Cattagni, 2001). Moreover, compared to the national average, Hispanic and Black youth are less likely to use a computer at school (NCES, 2001; NTIA, 1995, 1997, 1999, 2000, 2002) and TRPI studies indicate that many Hispanics have never used a computer at all (TRPI, 1998, 2000).

Despite the importance of access to network technologies, Hispanics still lag behind in computer and Internet connectivity

Although gains are being made in providing physical access to network technologies, other recent NCES data indicate that the quality of use of technology by classroom teachers differs markedly as a

function of school characteristic. These are perhaps the more compelling statistics, strongly suggesting that "use" is much more than merely the presence of hardware, software, and Internet access. Specifically, teachers in low-minority and low-poverty schools were more likely to use computers or the Internet for a wide range of activities (57%) than were teachers in high-minority and high-poverty school (41%) (Smeardon, 2000). These data indicate an important need to not only provide schools (or community centers or libraries) with access to technology, but also to provide adequate support and training to effectively integrate technology into the curriculum. For example, in a 20-state study of K–12 "best practices" in implementing education technology, the most pressing need voiced by faculty was for additional time and resources for professional development in the application of technology (Casson, et. al., 1997).

Access has become an issue of social equity since equal access to technology and the skills to use it are increasingly necessary for economic success (Chapman, 1998). Yet, there are still segments of the population that are technologically isolated and therefore at risk of losing out on the opportunities available in the digital age. One effective solution to bridging the digital divide is to provide underserved communities with public access to network technologies through community-based organizations such as schools, libraries and community centers. The programs highlighted in the Digital Steppingstones study illustrate six exemplary strategies—unity of vision, leadership, funding, partnerships and collaborations, staff development, and integration of technology—that are the building blocks of a successful public access technology program and that can be replicated by any program wanting to build or strengthen its own technology program.

UNITY OF VISION

Unity of Vision describes the manner in which a program conceives of its overall goals. Within the broad construct of "equitable access to technology," successful programs develop a vision appropriate to the specific community to be served and then align program practices to support the institutional vision. For example, technology may be used in a youth program to teach literacy skills and in a community center to teach job training for the unemployed. Whatever the program vision may be, it is clear that the likelihood of success increases as a program develops buy-in and, thereby, the involvement and support of the population it is serving.

EFFECTIVE LEADERSHIP

Effective leadership is best characterized by those who clearly articulate program goals, provide guidance and direction toward achieving those goals, display personal initiative and resourcefulness in developing partnerships and collaborations, and are innovative in problem-solving. Strong leadership, personal commitment and dedication are especially important in smaller programs that have fewer resources to draw on. Because the loss of a an individual leader can be a severe setback to a technology program, instituting a model of distributed leadership in which the decision-making process is diffused and collaborative can ensure the sustainability of a program.

FUNDING

Funding is perhaps the most fundamental and ongoing challenge faced by community technology programs. Since annual budgets are generally insufficient to establish or maintain an advanced technology program, it is often necessary to diversify funding sources through fundraising, soliciting

grants, or reallocating budget monies. While some programs received grants as the result of an individual learning to write grants through a process of trial and error, those programs that designated and trained a specific staff member to write grants, hired an outside grant writer or participated in a consortium that employed a grant writer were most successful. Some programs relied less on grants and other traditional sources of funding and chose more entrepreneurial solutions to fundraising, such as hiring out staff and equipment for business training sessions, renting out office space for club activities or even using program software to design T-shirts to sell in the community. Finally, some programs were able to redirect money from other budget categories to support the technology program, such as a school using funds for "learning materials" to purchase instructional software or a library using book buying funds to purchase an encyclopedia database.

PARTNERSHIP AND COLLABORATIONS

Many community technology programs work in isolation from one another and end up expending precious resources "reinventing the wheel." Yet, participation in partnerships and collaborations can benefit a program by improving the exchange of information and ideas, gaining access to resources, and increasing its network of contacts. Business and educational partners can provide money, hardware, software, tech support, training, expertise and volunteers. Partnerships are typically developed through personal contact and require a significant commitment of time, effort and a grasp of business principles for which people in the non-profit or public sector may not be prepared. However, networking with other local technology programs and non-profits, joining community organizations such as the Chamber of Commerce or Rotary Club or simply making the program visible in the community by inviting prospective partners to visit can all increase opportunities for collaboration.

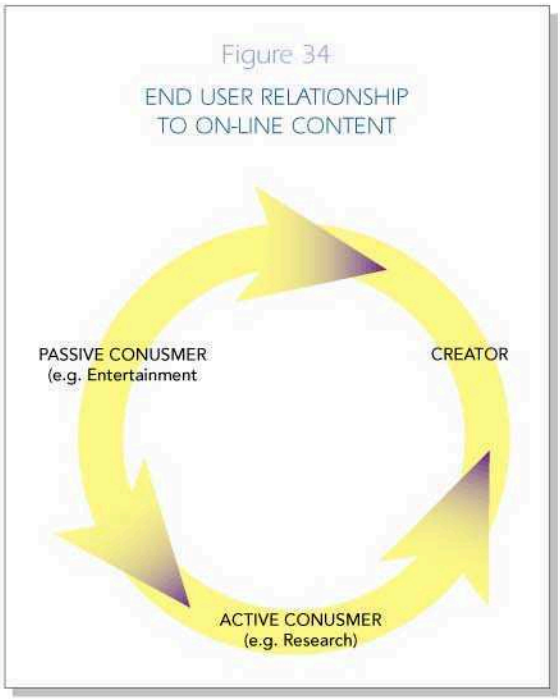
STAFF DEVELOPMENT

Staff development is a priority at successful technology programs because the technology cannot be fully utilized without a qualified staff available to train and assist users. Training must be ongoing to keep staff apprised of technology updates as well as to train new staff. Involving staff in the decision-making process can help foster staff commitment to the vision, reduce staff turnover, enhance staff buy-in to the importance of training, and, ultimately, increase program sustainability. Furthermore, establishing minimum computer literacy requirements as part of the hiring process and creating computer literacy standards for current staff ensures a basic skill level for all staff members.

INTEGRATION OF TECHNOLOGY

Integration of technology into the program curriculum requires moving beyond basic skills, such as keyboarding, and incorporating a set of technology, research, writing or production skills into project-based learning. How technology is specifically integrated depends on specific program goals and objectives. Technology integration may include teaching software, database and multimedia production skills in a community center that is geared

towards job training, or it may mean developing project-based learning to incorporate research, writing, creative, and critical thinking skills in a school classroom.



In implementing these six exemplary strategies it is important to keep several things in mind. First, no single "model" program was identified as working best. Whether small or large, wealthy or on a shoestring budget, an innovative program can have an important impact on its target community. By highlighting model strategies rather than model programs, the DSS study has sought to provide multiple solutions to common problems rather than prescribe a generic approach for all programs. In this way, strategies can be adapted to individual circumstances while leaving room for innovation. Second, while DSS survey data indicate that network technologies can have a positive impact on a person's quality of life, achieving literacy in reading, writing and arithmetic, as well as computer technology, is an ongoing requirement to ensure equitable access. Third, some study participants expressed their frustration with the lack of a coordinated, community-wide plan to create equitable access to network technology. This is often due to the fact that while money and other resources are available from the non-profit, private and public sectors, many programs find it difficult to expend already strained and limited resources on developing partnerships or writing grants. One solution may be to share resources, planning, costs, etc. between programs. While funds, personnel, training, and equipment may not be readily available in every organization wanting to create or improve a technology program, this problem could perhaps be overcome by coordinating the efforts of several institutions into a single collaborative access point. Rather than attempting to institute programs at every library, school or community center, it is possible for organizations to work together to create a public access point shared and supported by all. Finally, technology is evolving rapidly and with it the needs of the end user. As technology programs begin encouraging the active involvement of participants, end users are transitioning from being passive consumers of content, to researchers of on-line information, to becoming active creators of content and knowledge through processes such as asset-mapping and database creation (See Figure 34: End User Relationship to On-line Content). This concept underscores the ability of technology to empower individuals and illustrates the dynamic nature of the relationship between such activities as entertainment, research and knowledge creation with access as the interface that facilitates this empowerment.[4]

4 Macias, Elsa, et. al. (2001). *Network technologies in Hispanic-serving organizations: a case study evaluation.* Washington, D.C.: U.S. Department of Commerce.

RECOMMENDATIONS

The Tomás Rivera Policy Institute launched the Digital Steppingstones research initiative to determine how access to information technology is best achieved in the nation's low-income urban communities. The objective of this multi-year study was to explore the role of networked technologies in low-income and minority communities, and their effectiveness in meeting their information, education and communications needs. Our research focused on low-income and minority communities with limited resources, making funding and sustainability issues for high-priced technology programs particularly significant. Through this research we were able to identify the barriers to access to advanced telecommunications that exist in underserved communities and give direction on how to remove those barriers.

However, there is a continuing need for research on digital divide issues and for research on programs using exemplary strategies to provide access to networked technologies such as those recognized by the DSS project. Although recently the national dialogue has shifted slightly from the issue of the "digital divide" to one of "digital inclusion," the central importance of equitable access to information and communication technologies—including the skills and training necessary to use them effectively—in our society remains. The ability to create equitable access to technology will require a collaborative effort not only between the public and private sectors, but also within the community of public access centers.

PUBLIC ACCESS CENTERS

- Develop more public access centers for those who do not have access to technology at home, and where users can learn new skills.
- Conduct local community needs assessments to identify the most important needs and tailor the organizational vision to meet those unique needs.
- Collaborate with both the private and public sectors to maximize limited resources.
- Network with other community technology centers to share knowledge and information.
- Invest both time and money in on-going staff training.
- Foster the creation of relevant program content: the user should be viewed as both a consumer and creator of content.

PUBLIC SECTOR

- Expand the E-rate program and allow to cover staff training.
- Establish digital literacy standards for both end users and staff.
- Increase awareness of the importance of network technologies in various sectors of everyday life.

PRIVATE SECTOR

- Increase bilingual and Spanish language web-sites.
- Create on-line content relevant to specific ethnic groups.

APPENDIX: EXEMPLARY PROGRAMS

BRESEE FOUNDATION CYBERHOOD COMMUNITY COMPUTING CENTER

LOS ANGELES, CALIFORNIA

A safe haven in the neighborhood, the best quality computer technology and instruction, and an emphasis on caring relationships are the distinctive characteristics of the Cyberhood. In addition, the program has a special relationship with a consultant, who keeps its Apple-based systems on the cutting edge, and a team management style that ensures continuity and provides for development of new areas.

BROOKLYN PUBLIC LIBRARY GET SMART, GET CONNECTED

BROOKLYN, NEW YORK

The "Get Smart, Get Connected" program provides free public access to the Internet for its customers who have no other way to connect. Focus of this young program has been on getting technology installed within the context of a largely traditional library staff, and providing access to 60 locations. The program also serves as a "technological host" to other cultural institutions in Brooklyn, such as the Brooklyn Museum of Art.

CHICAGO PUBLIC LIBRARY CYBER NAVIGATOR AND COMPUTER CONNECTION

CHICAGO, ILLINOIS

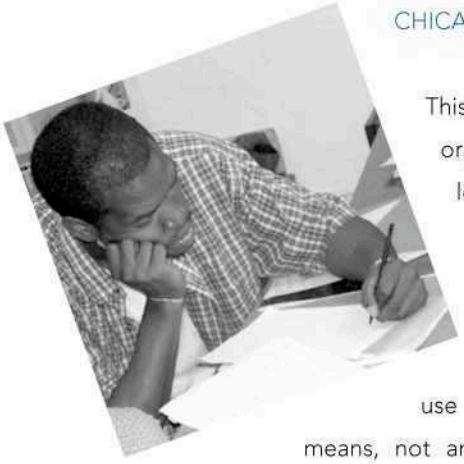
Computer-savvy students and interns are trained as Cyber Navigators in this summer program. The Navigators then train library staff to build databases and learn new software. They also work one-on-one with library patrons to build comfort in accessing electronic databases and the Internet.

CHICAGO PUBLIC SCHOOLS THOMAS KELLY HIGH SCHOOL

CHICAGO, ILLINOIS

The vision of this program is to prepare all students for the career requirements of the 21st century by providing access to technology that the students cannot get elsewhere. The passionately dedicated leadership and staff at Kelly High School have managed to succeed in raising the graduation rate from 18% to 80% in less than ten years, getting gangs out of the schools, teaching mutual respect, and ensuring that students have access to the same resources enjoyed by more affluent schools.

CHICAGO PUBLIC SCHOOLS
JOSE CLEMENTE OROZCO COMMUNITY ACADEMY
CHICAGO, ILLINOIS



This school is noted for its organization, dynamic leadership and progressive teaching philosophy. Orozco is an excellent example of the use of technology as a means, not an end. Emphasis is placed on critical thinking and analytical skills. Technology is integrated into the curriculum at the earliest grade levels, with students using computers throughout their years at Orozco.

COMMUNITY SCHOOL DISTRICT 8
HOMEBASE8
BRONX, NEW YORK

The HomeBase8 program goal is to provide every student's home with a modern computer, plus 'dial up' access to the Internet. Key to the success of this program is that the district insists that trainers be teachers first, and technologists second. Computer use becomes a normal part of the child's life, and improves parent-teacher communication.

ERIE NEIGHBORHOOD HOUSE
CHICAGO, ILLINOIS

The most important things about Erie Neighborhood House (ENH) are its integration of technology with program offerings, its emphasis on empowerment through education and career training for youth and adults, and a qualified staff that treats its clientele as professionals. They also have a drop-in "safe zone," since providing a safe place is a key community attraction.

HARAMBEE CHRISTIAN FAMILY CENTER
PASADENA, CALIFORNIA

The unique feature for which Harambee has been nationally recognized is its vision of community-generated leadership. IT training is provided to give youth marketable computer skills. With a philosophy rooted in the three Rs of Christian community development (relocation, reconciliation and redistribution) program staff live among the people they serve, have a love for community and family, and share their skills, education and resources.

CHARLES A. HAYES FAMILY INVESTMENT CENTER
CHICAGO, ILLINOIS

The Center's staff, many with Bachelor's degrees in IT or engineering, emphasizes economic self-sufficiency through career training, as opposed to job training. Following a highly pragmatic approach to career training, clients work their way out of poverty by focusing on education skills development that is tangible, applicable and marketable in gaining employment.

HOUSTON INDEPENDENT SCHOOL DISTRICT
HOGG MIDDLE SCHOOL
HOUSTON, TEXAS

This program offers technology instruction to students and community members. Utilizing seed money to provide training and build infrastructure, the Hogg program continues to expand. Its growth rate can be attributed in large part to strong leadership and the active involvement of the community.

LOS ANGELES UNIFIED SCHOOL DISTRICT
ELIZABETH LEARNING CENTER
LOS ANGELES, CALIFORNIA

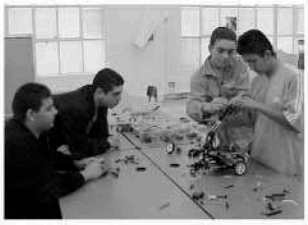
This high school in South Central Los Angeles manages its position in a feeder chain to provide student technical teams for elementary and middle schools alike. Students are trained for school-to-work and college prep. Good industry partnerships are built through strong relationships.

LOS ANGELES UNIFIED SCHOOL DISTRICT
FOSHAY LEARNING CENTER
LOS ANGELES, CALIFORNIA

High school graduates with competitive computer skills are the focus of this program. The program centers on a Product Development Center IT lab. One hundred percent of their high school students are accepted to college, and 60% of those are accepted to four-year schools.

LOS ANGELES UNIFIED SCHOOL DISTRICT
DAVID STARR JORDAN HIGH SCHOOL
LOS ANGELES, CALIFORNIA

In its first year as a Digital High School in the Los Angeles Unified School District, Jordan worked with a local vendor to use summer school students to install a LAN in a new Mac computer lab. Another new PC-based lab teaches students multimedia graphics. A partnership with Cal State Dominguez Hills provides college students and interns in math, computer science and engineering.



MIAMI DADE COUNTY PUBLIC SCHOOLS
RIVIERA MIDDLE SCHOOL
MIAMI, FLORIDA

Strong feeder school partnerships link with elementary and high schools. When one school takes the lead in acquiring funds or equipment, it is then shared with others in return for other resources. Strong leadership with a "why not" attitude towards everything, from integrating IT into the curriculum to partnerships, encourages faculty to be innovative.

MIAMI/MIAMI-DADE WEED AND SEED
MIAMI, FLORIDA

Weed and Seed is a collaborative strategy with two primary goals: to eliminate violent crime, drug trafficking and drug-related crime; and, to provide a

safe environment for law-abiding citizens to live, work and raise families. Ten law enforcement agencies and 72 economic and social agencies form the Steering Committee. The center offers computer training to youth and adults, using a comprehensive curriculum that includes basic computer fundamentals, word processing and the use of e-mail and the Internet.

MIAMI MUSEUM OF SCIENCE

MIAMI, FLORIDA

Strong leadership has produced a unified vision that museums can make science and careers in math, science and engineering interesting. Schools recommend girls with an aptitude for science; personal attention and caring staff keep students motivated, and "buy-in" is created by giving jobs to program participants. Several unique partnerships, including one with the University of Miami, offer experiences in scientific inquiry.

NEW YORK CITY BOARD OF EDUCATION FREDERICK DOUGLASS LITERACY CENTER

HARLEM, NEW YORK

The most critical factor in the success of the Center is having teachers on staff who are interested in using information technologies for educational goals. Assisted by computerized instruction, the teachers work with students who are living in poverty, and help them attain literacy in reading, writing, working and voting.

PLAYING2WIN

NEW YORK CITY, NEW YORK

Playing2Win is a membership organization that combines the latest computer technologies and high quality instruction to provide economic, social and educational opportunities for approximately 500 Harlem residents. Besides open access to computers, scanners, and digital cameras, classes taught at the center cover advanced topics, including Robotics On-Line, video production and web design. Playing2Win also serves the important role of bringing together isolated members of the community.

QUEENS BOROUGH PUBLIC LIBRARY WORLDLINQ

QUEENS, NEW YORK

Strong leadership, a sense of place, and highly qualified staff characterize Queens Borough Public Library. Connecting people, knowledge and information together, the Queens Borough Public Library aims to bring library resources to its predominately immigrant population in five different languages.

RIVERSIDE PUBLIC LIBRARY EASTSIDE CYBRARY CONNECTION

RIVERSIDE, CALIFORNIA

The Eastside Cybrary Connection consists of four components: a safe haven from gang divisiveness; a source of information literacy; supportive recognition of youth by adults; and, a force for community transformation. The key to the program is a "Driver's Training Manual" concept, used to train trainers as well as young "drivers." A unique community partnership helps families buy computers and establish credit at the same time.

SAN MIGUEL MIDDLE SCHOOL

CHICAGO, ILLINOIS

Space is at a premium, but the atmosphere is imbued with an out-flowing of love and compassion. Run by Christian Brothers, the emphasis is on getting youth immediate access to computers. Technology-based instruction frees teachers from typical classroom management; instead, they are placed in the role of advisor, assistant and guide. A critical factor to the success of this program is the commitment of the staff, many of whom are volunteers.

SPRING BRANCH INDEPENDENT SCHOOL DISTRICT

HOUSTON, TEXAS

This is a well-integrated team that is balancing site-based management with certain aspects of central management that places the organization well on its way to realizing its goal of a fully functioning distance learning program. Recently, the organization wired certain spaces in district-area apartment complexes which allowed students to access computer technologies without having to go to their respective schools. Distance learning has also been used to educate the community on health-related issues.

SPRING BRANCH INDEPENDENT SCHOOL DISTRICT
NORTHBROOK MIDDLE SCHOOL

HOUSTON, TEXAS

Northbrook's use of technology in areas such as music, art, and distance learning is a departure from many institutions where technology has permeated only to curricular areas, such as science, mathematics or social studies. The school offers computer literacy courses to sixth graders, and has a Technology Coach, whose job is to facilitate the integration of technology into its curriculum.

STREET-LEVEL YOUTH MEDIA

CHICAGO, ILLINOIS

This media program is unique in its lack of formal classes; instead, it is guided by a common ideology of "bumping into art and artists." Emphasis on building self-esteem through self-expression plays over into community transformation. Strong partnerships and shared decision making enable media production and video jobs to be created and contracted to center participants. Production proceeds contribute to the program's overall operating budget.

TOWN PARK NEIGHBORHOOD NETWORK CENTER

MIAMI, FLORIDA

TPNNC is an exemplar of partnerships between The Non-Violence Project (NVP), co-op housing residents, and HUD. The residents collectively pay for space to house a community center and a small computer center. Their shared vision is clear: increased skills mean better income and self-sufficiency. The Center also acts as an after-school safe haven, with tutors on site for homework support. Other programs include ArtTech, community health initiatives and summer camp.

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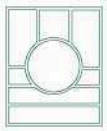

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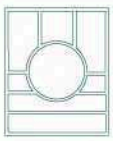

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