

# SRI International

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Community Technology Centers Program

## Case Study of Technology Access and Learning in Twelve Communities

**Prepared for:**

Office of Vocational and Adult Education  
U.S. Department of Education  
Prime Contract to MPR Associates: ED-99-CO-0160

**Submitted by:**

SRI International

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Center for Technology in Learning

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# Executive Summary

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The United States Department of Education's Community Technology Centers (CTC) program has been authorized under section 3122 of the Elementary and Secondary Education Act to

...increase access to technology and promote the use of technology in education through the development of model programs that demonstrate the educational effectiveness of technology in urban and rural areas and economically distressed communities. (Federal Register, 1999, p. 22954)

Under this language, the programs' three broad objectives include: providing access to computers and technology to adults and children in low-income communities who otherwise would lack that access; supporting learning outcomes by providing educational programs and services to center participants; and developing model programs that demonstrate the educational effectiveness of technology.

This case study report provides details and a comparative analysis of how twelve grantees across the United States work to achieve these objectives. The report describes successes in meeting program objectives, implementation strategies, program offerings, and implementation successes and challenges for centers operated by the grantees. The report also presents commonalities and differences among the grantees in their success in providing access to technology and services, the quality of learning opportunities, the characteristics of staff and staff development, and their plans for sustainability. Since it only discusses 12 of the 173 grantees funded by the Department of Education at the time of our visit, the report is not intended as a documentation of best practices or as a definitive statement about the program's overall effectiveness. Rather, it provides descriptions of centers that could form the basis of future studies of program impact.

The twelve sites we visited were chosen to highlight emerging practices at a diverse set of CTCs—e.g., type of programming, geographical location, characteristics of host agency, population served, and year of grant award. The selected sites included six that we visited twice at a one-year interval, and six that we visited in 2002 for the first time. Teams of experienced researchers, trained in administering interview protocols and collecting observational data, visited the sites for a period of approximately three days and

prepared standardized debriefing forms which were analyzed using an iterative approach to building explanations and rival accounts of the data. Although the majority of this report presents examinations of individual centers and their practices, we also present a cross-case analysis that focused on factors that we found to be associated with greater participation and better learning outcomes. This case study report was part of a broader evaluation of the CTC program that includes a summary of findings from grantees' annual performance reports and the development of reporting tools to aid CTC project directors.

As our cross-case analysis discussed, we found four factors to be particularly important in fostering participation and learning at CTCs. For the centers at our twelve sites, these factors were:

- Successfully confronting the complex and interrelated *access* issues facing their participants.
- Responding *flexibly* to provide participants with learning experiences that match their capabilities, needs, and authentic interests.
- Providing instruction by *committed* individuals who deeply understand the communities they are serving and “grow with” participants.
- *Sharing* programming, technical, and informational resources among centers in a region.

Across the sites we visited, we discovered that improving technology access depended on more than having a center that was open to the community. Access depended on the availability of transportation and the safety of the location. Access also depended on how inclusive and flexible programming was for the variety of participants who were interested in pursuing educational goals at centers. Centers' ability to be flexible in programming entailed, in part, having high-functioning hardware and a range of software tools to meet participants' goals. Additionally, access was enhanced in centers that conducted targeted outreach, and, for most participants, depended on classes being offered at no cost.

Centers varied in their success in providing educational services that met the needs of their participants. Nearly all were successful in providing supports both for participants new to technology and for those with some previous experience. Instruction at the centers was individualized for participants who either needed special help or who quickly became ready for new challenges. Centers varied with respect to how much they engaged learners in project-based activities that were relevant to learners' lives. All but one grantee

offered programs to school-aged youth; seven of these had strong connections with local schools and districts that aimed to better serve the educational needs of children and youth.

Staff at the centers we visited had varied backgrounds, and all grantees had staff who maintained strong positive relationships with participants. Most centers sought to hire staff who were from a similar cultural or linguistic background as centers' target population, but, even in cases where this did not occur, nearly all staff we interviewed had good knowledge of the communities they served. Across sites, participants praised staff for their flexibility in responding to learning needs and patience in adjusting the pace of instruction to the pace of learning. We observed among staff a willingness to work with students at their level until they learned a particular skill, no matter how long it took. Many staff we spoke with expressed their commitment to teaching in culturally appropriate and interpersonally supportive ways.

Although staff at the centers we visited had limited opportunities for formal professional development, they still found opportunities to learn what they needed for their jobs on their own. Often, staff were only a few steps ahead of participants in their mastery of the technology tools they were using. This arrangement, however, seemed to work out satisfactorily for both parties. Staffers discovered that they could effectively work just ahead of participants and make use of their newly gained understanding in instructing others.

Most of the CTCs we visited faced struggles in stretching their resources to cover their needs. These centers expected that once federal grants expired, they would not be able to sustain the same level of services for participants. Few had additional sources of revenue, whether from grants or service fees, that would sustain educational programming. Although the physical resources of the centers might be maintained, nearly all centers anticipated reducing their skilled staff, thereby reducing key supports for participants' learning.

In general, centers that seemed most likely to sustain high levels of services were ones at which a technology component had been added to a strong, already existing program. Other centers that seemed likely to sustain or further develop services were the ones that had formed alliances. Centers within these alliances were able to take advantage of one

another's resources for programming, technical support, and staff development. Some were able to secure independent funding for maintaining programming and services.

Cross-case analyses such as these must be interpreted carefully. Identification of general principles requires different research methods, including observation and experiment. We therefore limit our conclusions to the particular sites we visited. Although we cannot infer from our analysis general principles of best practices for CTCs, because our sample represents a range of centers, our cross-case analysis points to challenges that may be important to many other CTCs funded through the Department of Education's program. In addition, the factors associated with success that we present in this report can be taken as hypotheses to be tested in future research.

# 1. Introduction

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The disparity in computer access and literacy among different groups in the United States is well documented. According to the most recent statistics from the U.S. Census Bureau (2001), Americans with the highest annual incomes (\$75,000 or more) are three times as likely have a computer at home and four times as likely to be connected to the Internet as Americans from low-income households earning less than \$25,000 per year. Statistics like these are not simple consequences of differences in buying power or material lifestyle. They reflect deep differences in educational access and opportunity; people in low-income areas lack a social infrastructure of technology-literate friends, teachers, and colleagues to initiate and inform them through the casual interactions of daily life. Yet computer skills—including word processing, data management, and the ability to use e-mail and Web applications—more and more stand as fundamental qualifications for employment and requisites for functioning in the social and economic life of America today.

Since 1999, the U.S. Department of Education has funded a major initiative to meet the needs for technology access and training through its Community Technology Centers program. Recognizing that schools alone cannot provide sufficient opportunities for low-income children and adults to learn technology, the Department has instituted a program of funding community-based organizations, faith-based entities, community colleges, school districts, and other local agencies to create technology access and learning centers to serve local residents. This initiative builds on the documented success community-based organizations have had since the 1980s in creating learning environments that put technological tools into the hands of those least likely to have access elsewhere (Fowells & Lazarus, 2001; Strover, Straubhaar & Tufekcioglu 2001). Because of this record of success, in addition to the U.S. Department of Education, government agencies such as the National Science Foundation, nonprofit organizations such as PowerUP, the Urban League, and the Boys and Girls Clubs of America, and for-profit corporations such as Intel and Cisco, have contributed to building over 1,000 CTCs across the United States in the last several years.

Evidence suggests, however, that all CTCs do not achieve their objectives equally well. One study indicates that CTC programs are most effective when they form part of a coherent approach to providing educational services supported by instructors committed to the goal of helping others learn technology (Lentz, Straubhaar, LaPastina, Main, & Taylor, 2000). Fowells and Lazarus's (2001) study of community technology centers across California showed that successful centers tailored their curricular offerings to the particular needs of the communities they served. Rather than relying on packaged curricula and software alone, these centers generated their own approach to teaching participants about and with technology. The kinds of partnerships CTCs form are also important to their success in providing needed services. For example, building connections with industry is important to help ensure that curricular resources are relevant and support job placement (Chapple, Zook, Kunamneni, Saxenian, Weber & Crawford, 2000). Similarly, alliances with local schools are believed to be important to programs whose aim is to boost student achievement (Fowells & Lazarus, 2001).

Whatever their specific aims, CTCs attract, retain, and best serve participants by providing programming relevant to their lives (Fowells & Lazarus, 2001; Lazarus & Mora, 2000). On the most practical level—as is the case generally with voluntary educational organizations—CTCs must offer activities that participants like, or they will not come (Vandell 1999). From a contemporary pedagogical perspective, learning activities that best help people acquire useful skills, allow them to meet real-life goals, and motivate them to achieve at higher levels, are ones structured around *authentic, challenging tasks* (Means & Olson, 1995; Riel & Polin, in press). This perspective is grounded in decades of research leading to the insight that learning is not as much a process of accumulation of static facts as it is a process of participation in meaningful activity (Greeno, 1998; Rogoff, 1995). Moreover, learning is not only a function of the types of activities in which people engage, but also of the social and cultural context in which these activities occur (Cole, 1998; Lave & Wenger, 1991; Wertsch, 1997).

Relevant or authentic tasks provide learners with a compass. Research in cognitive psychology reveals the purposeful nature with which people undertake challenging intellectual activities—not as ends in themselves but as means to greater goals (Bransford, Brown, & Cocking 2000). Relevant educational programming is, by definition, transparently associated with its purposes and greater meanings for those involved. This

transparency helps learners reflect on what they are learning and how they might transfer new knowledge to other life situations (Lambert & McCombs, 1998). Often, this type of programming entails extended project-based activities that provide an opportunity for learners to develop deep understanding of subject matter as they acquire new information and concepts and apply this new knowledge to a production task (Blumenfeld, Soloway, Krajcik, Guzdial & Palincsar, 1991). Typically, through the course of completing a project, learners use multiple sources, collaborate with others, and apply cognitive tools to plan, conduct, and evaluate possible solutions to the problem at hand—important life skills for learners of any age.

Additionally, for programming to be relevant it must provide students with the opportunity to learn at their own levels of experience and rates of progress. Too often, learners are discouraged in formal educational settings by the ethos of competition and the culturally predominant view that some are highly capable of learning while others are less so. By scaffolding learners experiences within their “zone of proximal development”—that is, at a level at which they can gradually learn to perform without assistance from others—responsive instructors can help students recognize their prospective capacity to learn (Newman, Griffin & Cole, 1989; Wells, 1999). As we struggle, as a nation, to live up to our ethical commitment to provide education for all, community technology centers, by offering programming paced to meet the needs of all learners regardless of background or skill level, fill a critical niche in the educational landscape. It is through the lens of the best research in educational theory and practice that we consider the role of CTCs in responding to the unmet needs of many Americans.

## 2. Methods

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### Research Design and Approach

This report presents a qualitative multi-site case study of 12 grantees funded by the U.S. Department of Education's Community Technology Centers Program in the 1999 and 2000 grant cycles. The purpose of the study is to identify emerging best practices that maximize learning in community technology centers. The descriptions of centers in this case study report are not intended to reiterate or confirm information about centers that is available through the centers' annual performance reports, our summary of findings from these reports, or other documentation. Rather, the descriptions are meant to highlight the centers' successes and challenges, to portray the types of learning and other experiences made possible by the centers, and to bring to life the distinctive characteristics of each center.

Each of the cases presented in this report describes key outcomes for the grantee, its approach to providing access and opportunities for learning, the types of programming it provides, and significant features of program implementation. We have also described some of the challenges each grantee faces in achieving its goals. In addition to identifying successful strategies used by these CTCs to design, implement, and, in some cases, evaluate their programs, this report includes a cross-case analysis that develops preliminary generalizations about which factors contribute to successful outcomes, using data from the sites we visited.

### Protocol Development

The interview protocols used by researchers for this study were piloted initially during site visits to eight community technology centers in 1999 and 2000. Based on this pilot, the protocols were revised for use in the case study we conducted with centers funded by the Department of Education in 2001. The protocols were designed to elicit description of key aspects of the community context, program implementation, staffing, instructional approach, center leadership, involvement of stakeholders, participant experience, long-term outcomes, and plans for improvement and sustainability (see Appendix A). Four different interview protocols were developed, each tailored to be appropriate for use with

either center directors, program staff, community stakeholders, or center participants. Most of these protocols' categories match those specified in the debriefing form (see Appendix B), which similarly underwent two phases of testing and revision before use in the present study.

The artifact-centered interview protocol was based on an approach developed by Brigid Barron and her colleagues at Stanford University (Barron, Roberts, Osipovich & Ross, 2001). Modifications to Barron's design were made based on the types of participants and products we anticipated we were likely to see. The protocol was further revised following additional testing in the fall of 2001 with three participants in a CTC in New York City not funded by the U.S. Department of Education.

## Sampling

Our sample consisted of 12 grantees, six of which we had visited the previous year for the case studies used to develop our current evaluation framework, and six of which we were visiting for the first time. The grantees were chosen to balance their diversity along a number of dimensions, including:

- U.S. Geographical Location—for example, West Coast, New England, South, Midwest, etc.
- Programs/Services—including English language, education, career, and community-building programs.
- Clients Served—based on the age of the clients (preschoolers through seniors), and ethnic background.
- Community Type—rural, suburban, or urban; based on the population where the CTC is located.
- Host Agency—type of institutional sponsor, including local educational agencies, community-based organizations, municipal agencies, faith-based organizations, and institutions of higher education.
- Organization of Centers—whether a grantee has developed one center, multiple centers, or supports several new or existing centers, such as in an alliance or collaborative.
- Year of Award—whether the grantee was funded in the 1999 or the 2000 grant cycle.

Since a significant part of our interest in conducting the case studies was to identify and report on the best practices developing at the centers, we also chose grantees whose

annual performance reports included indications of high-quality programming and positive participant outcomes. After creating a list of candidate sites, the final 12 sites were chosen based on feedback from the CTC program administrators. Table 1 below summarizes the ways the 12 sites differ with respect to four of the selection dimensions: host organization, community type, target clients, and number of centers supported by the grantee. Brief descriptions of each of the grantees appear below the table.

**Table 1**

<b>Grantee and Location</b>	<b>Community Type</b>	<b>Target Clients</b>	<b>Host Agency</b>	<b>Number of Centers</b>
<b>TLC@Armory</b> New York, NY	Urban	Preschool children, School-age Children, Adults, Seniors	Community based	1
<b>Fast Forward</b> Columbia, SC	Town/Suburban	Preschool children, School-age Children, Adults,	Community based; housed in school; faith-based	1
<b>Literacy Volunteers</b> Phoenix, AZ	Urban	Adults, Seniors	Community-based literacy program	1
<b>Mott Community College</b> Flint, MI	Small Urban	School-age Children, Adults, Families	Higher education institution	3
<b>Friendship House</b> Washington, DC	Urban	School-age children, Adults, Families	Community and school based	3
<b>Blackfoot District 55</b> Blackfoot, ID	Rural	School-age children, Adults, Families	School based	2
<b>Digital Family Project</b> Indio, CA	Town/Suburban	School-age children, Adults, Families	School based	8
<b>East Bay Neighborhood Links</b> Oakland, CA	Urban	School-age Children, Adults, Families	Community based; higher education affiliation	5
<b>Mercy Housing</b> San Francisco, CA	Urban	School-age Children, Adults, Seniors, Families	Faith-based housing organization	7
<b>Seattle Public Library</b> Seattle, WA	Urban	Preschool children, School-age Children, Adults, Seniors, Families	Municipal library agency; some centers housed in schools	7
<b>ATEC</b> Eastern TN	Rural, Town/Suburban	School-age children, Adults, Seniors	Community based	9
<b>Lowell CTC</b> Lowell, MA	Small Urban	School-age children, Adults, Seniors, Families	Community based	15

**Technology Learning Center @ the Armory (Armory Foundation), New York, NY.**

This community technology center serves the Dominican neighborhood of Washington Heights. A strong component of this program is its project-based approach to teaching literacy and basic technology skills to adults, seniors and youth.

**Fast Forward (United Way of the Midlands), Columbia, SC.** This center, located in a local middle school, aims to increase technology literacy, improve job skills, and increase both personal self-sufficiency and sense of community for participants. The Fast Forward community technology center provides a range of programs for preschoolers, middle school students and their parents, and seniors in the community.

**Learn Center (Literacy Volunteers of Maricopa County), Phoenix, AZ.** Building on its strong base of volunteers, the Learn Center uses technological resources to increase literacy, English language skills, and technology competence in the economically distressed, ethnically diverse neighborhoods of western Phoenix. Its participants are assessed and monitored in accord with state standards, and develop their own learning plans with center staff.

**The Great Lakes Baptist District Center, the Disability Network Center, and the Hispanic Community Center (Mott Community College), Flint, MI.** Mott Community College is establishing three technology centers designed to serve the African American, disabled, and Hispanic communities in Flint. These three centers feed into a Regional Technology Center that prepares former manufacturing sector workers for jobs in information technology. The Disability Network center provides regional effect on services for the disabled.

**Friendship Community Technology Resource Centers (Friendship House Association), Washington, DC.** FCTRC integrates a wide-range of technology-based programming into the services it has been providing to youth and adults in this economically-distressed community for nearly 100 years. FCTRC brings after-school programming, adult computer education, adult basic education, and workforce readiness

programs to youth and adults in the community. Its project-based learning programs for both youth and adults have been particularly successful.

**Family Technology Centers in Blackfoot (ID) and Fort Hall (ID) (Blackfoot School District 55), Blackfoot, ID.** This center serves low-income community members living on the Fort Hall Reservation and in a farming community in Idaho. The program aims to provide academic supports to students to help them succeed in school, including a strong parent component. There are also adult classes focused on basic computer skills and applications.

**Digital Family Project (Desert Sands Unified School District), Indio, CA.** This school-linked program leverages funds from several technology training programs for teachers and the 21<sup>st</sup> Century Learning Center program. It serves a community of Hispanic agricultural and hospitality-industry workers. Adult education and computer classes are offered, with a primary focus on literacy, improving home-school connections, and parent involvement.

**Coronado and M. Robinson Baker YMCA, Street Tech, Urban Voice, and the Crescent Park Multi-Cultural Family Resource Center (East Bay Neighborhood Links), Oakland, CA.** A collaborative sponsored by the YMCA of the East Bay, this program focuses on both adults and youth and has strong vocational education, job training, and placement components. The program serves primarily the African American and Latino communities of West Oakland and South Richmond.

**Mercy NET Centers (Mercy Housing California), San Francisco, CA.** Mercy Housing provides technology training as a part of its core services to multi-ethnic, multi-lingual residents of low-income housing complexes. Technical support, outreach, curriculum development, and staff training are provided to its seven NET centers by Mercy Housings' central staff. The NET centers offer programming that supports computer literacy, job skills, academic achievement, ESL, and multimedia design.

**Seattle Community Technology Alliance (Seattle Public Library), Seattle, WA.** SCTA supports community technology centers that provide after-school activities, adult and family literacy programs, career development and job preparation services, and small business support to low-income areas across Seattle. It provides funding, technical support, leadership, professional development, and opportunities for communication and collaboration to the seven CTCs it currently supports. The alliance is expanding its services to assist other CTCs as funding and staffing allow.

**Appalachian Technical Education Centers, (Douglas-Cherokee Economic Authority), TN.** These centers serve an impoverished rural, four-county area in East Tennessee, providing support for literacy and academic achievement, job skills services, small-business development support, and a full range of basic and more advanced technology training to youth and adults in the region. ATEC additionally provides summer camp for middle-school youth and supports special programming for seniors.

**Lowell Community Technology Consortium (Lowell Telecommunication Corporation), Lowell, MA.** LCTC is a collaboration of community technology centers serving the diverse residents of the Lowell Enterprise Community. The consortium supports local community technology centers by standardizing curriculum and training materials, providing ongoing technical support, and creating opportunities for centers to disseminate best practices and assist one another in overcoming the challenges facing its members. The consortium aims to build a technology education program that focuses on a project-oriented, student-centered curriculum.

## Data Collection

Of the twelve sites visited, six new sites were visited by teams of two researchers for a period of three or four days between February and May, 2002. One or two researchers who had previously conducted visits with the six sites from the previous year's study revisited the same sites for periods of two to three days between January and April, 2002. Each research team used the standardized set of protocols to interview project directors, center staff, community stakeholders, and center participants. These interviews were

recorded and summarized or transcribed. The researchers also conducted “artifact-centered interviews,” asking participants to tell how they had developed their skills while showing the researcher a technological product they had created. All of the artifact-centered interviews were video- or audio-taped for later transcription. The researchers also compiled field notes based on observations of center activities, took photographs and video footage, and collected fliers, brochures, news articles, examples of student work, and other artifacts. After conducting their site visit, the researchers incorporated the informational data they had collected into a comprehensive debriefing form that prompts researchers for data in the categories and subcategories of potential value to our analysis (e.g., project origins, mission, software and hardware resources, programming, staff qualifications, etc.). Completed debriefing forms from all research teams were received and reviewed by early June, 2002.

## Training Procedures

In mid-December, 2001, all members of the research team participated in a half-day training that was held to review the interview protocols, interview techniques, debriefing process, site visit preparations, human subjects requirements, and other procedures that team members would be following. Guidelines for participant observation and writing field notes were also extensively reviewed. Researchers were given a set of relevant articles to review, including a draft of the America Connects Consortium *Agenda for Research and Development*, that highlight key issues in conducting research on CTCs. Researchers were asked to keep the following validity-criterion in mind: “Will this case give CTC program administrators and practitioners in other community technology centers a good view of what access and learning opportunities really are like at this center?” In early February, the case study team participated in another meeting that reviewed the summary of findings from grantees’ annual performance reports, highlighting again the importance of variables such as quality of programming, qualifications of staff, etc.

In preparation for their site visits, the researchers reviewed grantees’ applications, performance reports, and any information about the grantee available on its Web site or other online resources. They also contacted their assigned centers to make arrangements

for conducting participant interviews and forwarded human subjects consent forms for children to take to their parents prior to our visits.

The site visit teams all consisted of at least one Ph.D.-level researcher who had recently conducted similar site visits to CTCs for prior SRI studies. Approximately half of the 13 members of the team had extensive experience working in or managing CTCs, and all the team members had done prior research in community technology education, adult basic education, community literacy programs, or learning in out-of-school settings. All the researchers also had experience conducting case studies. The case study project leaders assigned researchers to sites partly based on their particular knowledge of the geographical area, the type of host institution, or the grantee itself. For example, one team member, Melanie Daniels, who had been a program director and staff trainer for adult literacy programs, was assigned to visit the CTC operated by the Literacy Volunteers of Maricopa County in Arizona.

## Analysis

We approached our data using an iterative approach to building explanations (Yin, 1994; Merriam, 1998). In cross-case analysis, it is important for researchers to investigate *rival explanations* of data (Yin, 1994), that is, alternative propositions or conjectures about the significance or meaning of particular pieces of data. For example, one proposition about the effectiveness of community technology centers would be that they provide access to CTC participants who would otherwise have no other access to computers and the Internet. A rival explanation would be that there are many other possible places besides a CTC where participants could use technology. In the analysis, researchers need to search for evidence of both of these possible explanations of the data, to determine which one has more evidence to support it.

Our analysis began with a careful reading of all debriefing forms, interview transcripts, and collected artifacts. Based on this reading, our previous research (Korbak, Penuel & Kim, 2002; Penuel, Michalchik & Kim, 2001; Penuel & Kim, 2000), and relevant literature (Lentz et al., 2000; Fowells & Lazarus, 2001; Lazarus & Mora, 2000), two of our team members iteratively developed a list of 16 initial propositions, each with a number of rival explanations, to account for the phenomena we had documented. After this initial

list was refined, a third colleague was asked to independently code four of the 12 debriefing forms to test the validity of propositions and provide an indication of the reliability with which they could be used as a coding scheme. This process led to a further refinement of the propositions, and, when reanalyzed, reliability rates were over 90% for two researchers scoring a set of four debriefing forms.

Our final list included 29 propositions clustered into three groups of issues that we postulate lead to or correspond with positive outcomes (see Appendix C). These issues include: (1) the success with which centers provide access to technology for individuals in the community served; (2) the types of learning opportunities provided to meet individual and community needs; and (3) the qualities and qualifications of center staff. A fourth category of propositions pertained to center sustainability, which is particularly significant for those centers in their third year of Department of Education funding.

Using these 29 propositions and their many rival explanations, a data matrix was created, incorporating text and synopses of text from the twelve debriefing forms. This matrix was used to analyze each proposition and generate sub-propositions toward a well-textured comparison of the 12 sites visited. Meanwhile, in conversations with Department of Education administrators, it was decided to emphasize in our report portraits of each center that could help readers account for how the center achieved its outcomes. As mentioned above, these individual cases describe each grantee in terms of its accomplishments, approach, programming, particulars of implementation, and challenges. Accomplishments for each of the centers were independently coded from centers' annual performance reports by two different researchers, and any discrepancies were resolved to mutual satisfaction for the version presented in this report.

Our cross-case analysis, which follows the individual case descriptions, is both descriptive and evaluative in purpose. We intend both to account for the current practices in centers and to highlight successful strategies through a comparative approach. Also, the cross-case analysis connects descriptions of center practice to important findings and insights from the learning sciences, as presented in our introduction. As a form of triangulation, individual case descriptions and data coding forms for the cross-case analysis (i.e., subsets of the data matrices) were reviewed by at least one member of the site visit team for review and comment. Draft copies of subsections of this report, furthermore, have been circulated to center directors and staff for review and comment.

### 3. Technology and Learning Center at the Armory

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**Armory Foundation, New York, NY**

#### Program Summary and Accomplishments

The Technology and Learning Center at the Armory (TLC @ the Armory) brings computer literacy to youth and adults who otherwise have limited access to technology in the Washington Heights neighborhood of New York City. The TLC is one of several community services offered in New York's historic Armory building, each of which benefits from the others' ability to draw and refer participants. The residents of the area, mostly recent immigrants from the Dominican Republic and a smaller community of seniors, have been active participants in the TLC's programming, demonstrating an eagerness to learn the new skills afforded by computer technology.

Three community organizations with complementary missions founded the TLC @ the Armory, securing donations of equipment to establish its operations even while applying for funding from the Department of Education to create the center. The partners also hired an experienced technology educator, who consulted with other technology and literacy specialists to establish the center's programming. In addition to open-access hours, the TLC @ the Armory offers specialized programs for children, teens, and adults of all ages, including a literacy project for elementary school students and personalized support for seniors working to develop technology proficiency. The directors of the TLC @ the Armory have worked to design programming that is as learner-centered and project-oriented as possible. They have also been able to develop a volunteer base to deliver instruction and to assist participants during open-access hours. According to the TLC's records, volunteers contributed over 700 hours in Year 2 of the grant to help with program implementation. Since its beginning, the TLC @ the Armory has hired outside evaluators to help improve its programming and track participation at the center.

The TLC provides 41 networked computer workstations for participant use. Duplicated counts for the center's second year of operation include: adults who completed one or more computer literacy classes—504; elementary students who attended an eight-

week literacy program based in writing book reviews—232; youth participating in computer literacy and career preparation program—180; adults attending ESL and GED classes—186. Overall, the TLC @ the Armory reports serving more than 3,000 users per year. Of 156 participant satisfaction surveys covering 13 separate course sessions, 98 percent of respondents said the material was clearly presented, and 87 percent rated the overall performance of the instructor as excellent.

One of the concerns expressed by the TLC @ the Armory's current evaluator is that the center has not made its presence sufficiently well known among the broader range of potential users—either among those who use the Armory for other purposes or residents of the Washington Heights neighborhood. Norbert Sander, who directs the Armory Foundation and oversees the operations of its community technology center, agrees that more outreach is needed. At the same time, Sander envisions a substantial reorganization of the center to accommodate better the academic needs of young athletes who use the track and field facilities in the Armory building. He also has planned to integrate the center with a track-and-field museum being developed at the site. As the TLC @ the Armory undergoes changes in staffing and mission, redesigning itself to focus more on academic support, it also is undergoing changes in the types of programming it provides and participants it serves.

## Basic Strategies

### *Approach*

The TLC @ the Armory takes advantage of the center's location in a building that serves both the diverse Washington Heights neighborhood in which it is situated and New York City's track-and-field community. The Armory, which has played many different roles during its 93-year history, currently provides a variety of on-site social services, in addition to housing one of the country's fastest indoor tracks used by schools from across the city. The TLC is an important hub within the array of community services offered at the Armory—including literacy, career development, teacher training, immigrant, homeless, drug treatment, and senior citizens health services—each benefiting from the others' ability to draw and refer participants. From the beginning, the residents of the area—mostly recent immigrants from the Dominican Republic and a smaller

community of seniors representing an earlier ethnic mix of New Yorkers who have lived in the neighborhood for decades—have been active participants in the TLC’s programming, demonstrating an eagerness to learn the new skills afforded by computer technology.

The TLC @ the Armory is a partnership among the Armory Foundation, which manages the building’s facilities and programs; the New Heights Neighborhood Center, a community education referral service; and MOUSE (Making Opportunities for Upgrading Schools & Education), a nonprofit organization dedicated to supporting technology integration in schools and community centers. These three organizations have been able to complement one another’s strengths in running the TLC: the Armory Foundation provides space for the center; New Heights Neighborhood Center provides GED and ESL classes at the TLC in addition to referring participants; and MOUSE provides contacts and expertise for developing community technology access and programming—for example, it was able to secure a donation of 50 computers from Alta Vista for starting the TLC. Each of the organizations have been active from the beginning in conceptualizing the goals and program offerings at the center.

The leadership of the TLC has been committed to providing high quality programming that responds to the needs of its participants. Stephanie Penceal, an experienced technology educator who directed the TLC its first two years, sought the counsel of literacy organizations and colleagues in the educational community to develop key aspects of the TLC’s programming. Penceal and her technology coordinator, Christian Mariano, who began managing the center when Penceal left to pursue other opportunities in December 2001, have worked to design programming that is as learner-centered and project-oriented as possible. They have also been able to develop a volunteer base to deliver instruction and to assist participants during open-access hours. According to the TLC’s records, volunteers contributed over 700 hours in Year 2 of the grant to help with program implementation. These peer volunteers serve to make the environment more welcoming and responsive; help comes in the form of someone who may be just one step ahead of the learners. Volunteering also gives participants another powerful avenue for learning—teaching others.

Its commitment to providing high quality services has included the use of qualified outside evaluators to shape and improve its programming. The original evaluator hired by

Penceal was replaced during the first year of programming because Penceal felt the evaluator was not sufficiently competent to do the required work and behaved intrusively with participants. Also, interestingly, the evaluator doubted that book reviews produced in an after-school literacy program were actually written by the children. Penceal consulted with several prominent educational technology organizations, including the Center for Children and Technology, to choose James Meier of Arete Corporation as the new evaluator, who continues to work with center staff to collect data on participation and outcomes.

The TLC staff has had to spend little time on outreach, partly because the neighborhood residents have strong networks of communication, and many already attend other programs at the Armory. When just a few people in the neighborhood learned that free computer classes were being offered at the Armory, residents rushed to sign up. Classes were filled before they began, and staff scrambled to be able to offer new classes to meet the growing demand. Classes and open access hours at the TLC generally remain full, both because of word-of-mouth among neighborhood residents and because of the steady stream of people that learn about the TLC when they come to use the Armory for its other activities and services. For example, many participants come from a walking club organized by the Isabella Geriatric Center, a nonprofit “continuum-of-care” program for seniors in the neighborhood. A group of students who attend the Spaghetti Book Club literacy program are also enrolled in the Armory’s other after-school programs. Despite the TLC’s success in drawing participants, however, senior Armory management, the TLC staff, and some center participants do not share a vision of whom the center should be serving and, consequently, what the nature of center programming should be. This fundamental question underlies the TLC’s basic approach and is likely to significantly change the character of the center. These issues will be discussed under “Challenges to Effectiveness,” below.

### ***Programming***

There are currently eight programs underway at the TLC to serve local residents of a variety of ages. They include:

- Reading Readiness – Literacy classes for pre-schoolers.

- Spaghetti Book Club – Literacy project for elementary school students.
- Tech Squad Club – Technology training for middle and high school students.
- Classes for young adults and adults – GED, ESL, Computer & Internet Basics, and various software applications.
- Community School District 6 Weekly Access – Professional development for teachers and instruction for parents.
- Open Access – Daily hours when community residents can use computers, access e-mail and the Internet, and work on projects.

Classes are offered at the center Monday through Friday from 10:30 a.m. to 8 p.m. Most of the classes offered during the day focus on basic introductory computer skills and are attended by adults, including the many retirees who come to the center. Children and youth, many of whom participate in other programs at the Armory, attend in the early or mid afternoons. Open access is provided on Mondays and Fridays from 10:30 a.m. to 5:30 p.m. and Thursdays from 6 to 8 p.m. for anyone who has participated in center programs. During these hours, nearly two-thirds of the workstations are used, and staff and volunteers provide individual assistance and tutoring to participants. There are two separate labs at the TLC, the larger containing 19 workstations and the smaller containing 16. All are networked to the Internet with a T1 connection donated by Globix Corporation. One lab includes a reading nook, where young children can sit and read children's books that are part of the TLC's literacy program.

A six-week summer bilingual literacy program for preschoolers called Reading Readiness was piloted during the summer of 2001. The program focuses on vocabulary, syntax, and listening comprehension. A parent component teaches parents to talk with their children in ways that familiarize them with the patterns of question and answer typical in schools. For elementary school students, the TLC offers the Spaghetti Book Club, an early literacy project that primarily targets first-graders who are just learning to read and write. The project lasts eight sessions over 4 weeks, and in it students read and review a children's book. Each session includes a group "read aloud," a mini-lesson that addresses one of four different aspects of a book review. Students also have time to practice writing their book reviews and have them read and critiqued by peers. Ongoing revision and public review are integral to the cycle of learning. When complete, students

submit their reviews with an illustration they've scanned in to be published on the Spaghetti Book Club Web site (<http://www.spaghettibookclub.org>).

The Tech Squad, which meets for four hours per week, is composed of the middle- and high-school aged participants in the center. The Squad is modeled after other programs of MOUSE that involve students in design projects. At the TLC Tech Squad participants have been developing Web pages for organizations in their community and creating online journalism projects that highlight teen issues. In fall 2001, the Tech Squad began a computer repair and recycling course, in which students learn about configuring a computer by examining its insides, repairing broken parts, and giving them to participants in the center to take home. Members of the Tech Squad also participate in the Summer Youth Employment Program, working as interns in the TLC assisting Christian Mariano with maintenance tasks and helping center users during open access hours. Staff and students at the TLC report that the middle school tech squad participants derive satisfaction as “ambassadors” of the center in schools, teaching teachers and principals how to use technology.

Facility with word processing and email are among the chief skills that participants learn in the adult computer literacy courses. Classes focus mostly on the basics, although progressively greater numbers of participants are becoming advanced-level users. During the summer of 2001, over 40 people enrolled in the new Microsoft Office Users Specialist (MOUS) Certificate Program, which included certification in MS Word and MS Excel. Certification in Access will be added to the MOUS program as well. In general, as participants become more advanced, training in new software packages is added to center offerings; recent additions include Adobe Publishing Collection and Quark Xpress.

The basics of technology are also being introduced into adult education programming at the TLC. In the summer of 2001, the TLC collaborated with the New Heights Neighborhood Center to launch the GED Academy, a technology-supported program that targets students' need to receive more comprehensive training for college and job readiness. During the six-week program, students attend class for five hours a day. Monday through Thursday, three hours a day are devoted to instruction for MOUS certification (MS Word, MS Excel), and two hours to GED preparation. Students use GED Interactive and GED Practice Exams software to support classroom instruction. Friday of each week focuses on career and college exploration.

The partnership with Community School District 6 provides parents with workshops in the use of computers so that they can help teach their children and be more involved in school/home communication related to curriculum standards. The workshops are taught in both English and Spanish. These workshops are very large (usually more than 30 students), requiring students to double-up on the center's computers.

## Success of Implementation

Although its programming has by-and-large served the TLC's various constituents well, the TLC has served seniors particularly well. The older adults who come to the Armory are among the primary daytime users of the TLC, and the needs of these seniors are being met by a wide array of class offerings and by instruction that is tailored to suit their preferred learning pace and style. Center leaders found that when seniors were in a mixed class with younger adults seeking employment training, the pace was too slow for the younger learners. Conversely, seniors found it frustrating to go through a fast-paced certification course in which the instructor moves on, whether everyone has gotten the material or not. Rather than offer classes to groups that are age-mixed, the TLC has thus developed different "tracks" of program offerings for groups of participants: non-working adults, working adults, seniors, and school-aged youth. There has even been a set of classes offered in the non-working-adults track for the homeless men living onsite in the shelter ("Comprehensive Computing").

The Armory staff has developed a patient approach to helping senior learners, who like to ask lots of questions and move slowly through material. The seniors we interviewed acknowledge this patience and feel a special gratitude toward instructors at the Armory, in contrast to other places where they have taken computer classes. One senior, for example, said she found another program to be too expensive, with few opportunities to really learn how to apply what was being taught. She said the supporting materials at the TLC and the patient and effective instruction have helped her tackle computing challenges more successfully.

In addition to the attention of the staff, seniors often get help from other seniors. Learning at the TLC is often "side-by-side" in a very real and physical sense, with volunteers and peers sitting behind or beside participants who are registering for an email

account, learning how to format and save a Word document, or finding a Web site for a local newspaper. This one-on-one attention is much appreciated by many participants, but especially by seniors, who cite such help as one of the key reasons why they keep coming to the center. For some participants, being able to volunteer and help out others is an important outcome in itself.

The proactive attitude evidenced by senior volunteers manifests itself in other ways. For example, seniors have led the charge in asking that more projects be incorporated into basic courses on computer literacy. The result has been impressive: one senior we interviewed showed us how she had created flyers and invitations for a big community event sponsored by her local neighborhood association, using software and hardware she had learned to use at the TLC. The woman was the secretary of the organization, and the clear benefits to her from designing the flyer were savings to the association and a boost in her self-confidence. Others at the center have created calendars, books, and advertisements for local businesses using the skills that they have learned in classes at the TLC. Still others said they have learned lessons of a different sort—about the Internet and the impact of information and information technology on society as well as the local community.

Beyond skills and knowledge, the CTL is meeting another primary need of all seniors—the need to be part of a community. The Armory gives seniors a place to be with one another and develop channels for communicating and connecting with others (e.g., through email and the Internet). Seniors we talked to at the center reported developing ties with other senior participants, with members of the Washington Heights community, and with distant friends and relatives through the Internet. The seniors saw themselves as an important ‘constituency’ of the center; for them the TLC @ the Armory is an important place in their community, and helps them stay connected and involved in their neighborhood. From informal conversations with one senior at the center, we learned about the significance of the center for participants’ sense of belonging. Having the TLC there is "good for mental health," according to this senior, and is a vital part of many seniors’ day. Participants at the TLC seem to know and care for each other at the center; they check up on each other and ask how their families are doing. When interviewed, they mention each other by name and ask, "Do you know her?" Beyond learning about technology per se, the TLC serves as a community-building and

community-gathering place that has made a significant difference in the lives of many seniors.

At the other end of the age spectrum, the TLC has been met great success with its implementation of the Spaghetti Book Club, the early literacy project in which participants review a children's book. These reviews "by kids for kids" are published on the Spaghetti Book Club's Web site (<http://www.spaghetlibookclub.org>), alongside submissions from other children throughout the United States. The submissions include a scanned-in self-portrait and an illustration created by the students. "Their piece is published in cyberspace for all to see, and not just in their classrooms," says Julie Rosemarin, a Bank Street College graduate and former teacher who developed the project as a way to get students excited about writing about literature.

The project has been enthusiastically embraced by youngsters at the TLC @ the Armory. The success of the project is due in part to the instructional design underlying the Spaghetti Book Club concept, as well as the nurturing and pedagogically appropriate way that the TLC staff has implemented it. The project takes students through a single book and, through iteration, students develop a more coherent and polished review. In their reviews, the students are called upon not just to summarize the book, but also to provide their own opinions and make recommendations to others about the book. They also spend considerable time revising and polishing the reviews. This ongoing revision and public review are integral to the cycle of learning.

Students get to pick their own book to read and review. The facilitator or teacher provides assistance, focusing on all aspects of learning how to read and write. At different stages during the revision process, students review each other's work and provide suggestions for improvement. Each of these strategies—studying a book of one's own choosing, connecting to personal experience, and peer review—is important in a learner-centered approach.

The students we observed at the TLC deeply engaged in the process of writing and revision. Even in the after-school hours, nearly all the participants were actively engaged in revising and improving reviews they'd already begun. The examples from students who've participated in the program at the TLC @ the Armory illustrate the power of the program. The content summaries indicate the students' comprehension of the plot of the stories, and their opinions and recommendations show an ability to write for an outside

audience. Here's an example of one submission by a six- year-old student, Matthew S., in the program at the TLC @ the Armory.

### **Dog Days**

Written by Dilys Evans • Illustrated by Krisztina Bentley

Dogs come in all shapes and sizes. There's a dog of every kind. Perty is clean, Dusty is dirty, Daisy is awake, Fluffy barks hello, Curly barks goodbye, and spot is asleep. Bowser's ears are long, Groucho is mean and buddy is nice. These are some dogs from the book. Sometimes dogs live with each other.

There's a dog that's like a Dalmatian. I like Dalmatians, they're great. I have a video game of that! I've seen black and white dogs before. They are great dogs! My favorite part of the story is when Dusty is cleaning himself with his paws, but that's dirty. But that's really funny!

You know this book is about opposites!

I would like first and second graders to like this book. I would like everybody in the whole world to read this book because it's really fun. But not aliens!

Even as a beginning writer, Matthew demonstrates a developing understanding of the book's broader themes—the variety of dogs, the idea of opposites—and the particular ways in which the book develops these themes. He also is able to relate details of the book to his own experiences and express for his audience his enthusiasm for them to share his pleasure in reading the story.

## **Challenges to Effectiveness**

Dr. Norbert Sander, who originally established the Armory Foundation in 1992, has begun restructuring the TLC—changing its objectives, its programming, and its staffing. Concerned that students' academic achievement is much too low, even among the TLC's participants, Sanders wants the TLC to provide much more intensive and structured academic support for youth—especially the athletes—who attend other programs at the center. Sander expresses particular disappointment in the performance on the GED exam of students who had participated in the test-preparation programs offered by the New Heights Neighborhood Center at the TLC.

In addition to a sharper focus on academics, Sanders would like the TLC restructured to serve more people. He emphasizes wanting to draw more of the teens who come to the Armory into the TLC's activities. He additionally notes that even though the center as it is now operating is often at or close to capacity, it still has not made its presence sufficiently known among residents of the area, and even among users of the Armory facilities. Interviews by Arete Corporation with people from several neighborhood organizations support this view.

Sander's vision for a fundamental reorganization of the TLC stands, in many ways, at odds with the aims of the center thus far, making moot many of the challenges facing Christian Mariano, the one staff member remaining after the departure of Stephanie Penceal in December 2001. Sander is exploring how a focus on test-preparation—such as the kinds of services offered by for-profit entities—might be of benefit to young people who are already coming to the Armory in large numbers. He is considering privatizing the instruction, inviting SCORE or Kaplan to use the space to offer programs. Sander also wants programs at the TLC integrated with the new Track and Field Hall of Fame being built at the Armory. He specifically would like to have museum visitors be able to access the technology resources of the TLC to obtain online information tied to museum exhibits.

Sander's characterization of needs stands in contrast to the views of some of the older adults who come to the Armory—a main constituency for the center. The seniors maintain a strong interest in the communications and community-building functions of the center. One senior approached our research team early in the morning of our visit and asked us what could be done to “save” their center. Clearly, some of them seem to know of the plans for changing the center's overall vision and are concerned that they will be left out. How the Armory handles its senior constituency is, in the minds of many, a key test for the success of the center.

Meanwhile, the TLC operates much as it did before Penceal's departure. Calvin Hastings, a staffer for MOUSE who wrote the original CTC grant, had been slated by Sander to provide interim leadership for the center on a consulting basis while the new direction and programs were being established. However, since helping the Armory win the grant to open the TLC, MOUSE has fallen on hard times itself and consequently re-focused its efforts on bringing technology to schools. In the tight funding climate, the

organization's formal involvement with the TLC has been drastically cut back, with Hastings playing only a minor advisory role to the center.

Still, the TLC @ the Armory has a depth of assets and possibilities for the future. Touting the TLC on its Web site, the Armory Foundation seems committed to maintain it as "the most prominent of the Armory's Community Programs," whose aims are to:

- Provide an educational and vocational complement to the robust physical activity in the Track & Field Center.
- Help to close the digital divide by bringing computer literacy to youth and adults who otherwise have limited access to technology, particularly the residents of Washington Heights.

Although its focus may shift, the TLC at the Armory will likely retain some of the characteristics that made it attractive and useful to its participants during the years it operated under the CTC grant.

## **4. Fast Forward Community Technology Center**

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**United Way of Midlands, Columbia, SC**

### **Program Summary and Accomplishments**

The Fast Forward Community Technology Center in Columbia, South Carolina, serves close to 2,000 people a year from a large room located at the Hand Middle School. Although the center is located in a relatively affluent neighborhood, it serves a wide area and focuses on providing technology access to the poorest communities in and around Columbia. Fast Forward has teamed with local faith-based groups and other volunteers to provide transportation for children from these communities, and gears its programming to serve those most in need of learning basic technology skills. Fast Forward's focus is on building technology skills to support the education of poor children and to further the career goals of adults.

Fast Forward offers technology access and formal learning opportunities to participants of all ages, including preschoolers, middle school students, parents, and seniors. It focuses on structured programs rather than drop-in or casual use, offering roughly 6,550 "instructional hours" per year. About 160 preschoolers attend sessions for about an hour each week. There are many programs for elementary school students, including an introductory session and a special transition course that has been offered to more than 200 elementary school students moving into middle school. To address the needs of elementary and junior high school students in the region, Fast Forward has offered technology access to more than 300 students at Hand, and full-semester courses for computer introduction, keyboarding, and PowerPoint. The center has 37 networked computer workstations.

In addition to an after-school program, Fast Forward has established a laptop loaner program that has been used by 150 middle school students who lack access at home. About 118 adults have attended six hours of introductory computer courses and received continuing education credits from Midlands Technical College. The majority of these (65 percent) were senior citizens. In addition, about 250 of the parents of the sixth graders at Hand Middle School were introduced to the lab. Fast Forward volunteers contributed

over 2,200 hours of time to helping at the center; 1,750 of those hours were contributed by youth, ten of whom received national awards for their service.

The center is beginning to strategize plans for sustainability, such as by offering fee-based courses and replicating the program in satellite locations. Still, it confronts basic problems associated with securing funding to sustain its programs and services. One of the board members of Fast Forward believes that growth is critical to long-term sustainability and will require new partners and new sources of funding. In the long term, the center director wants to open a whole new line of six “hub-and-satellite” computer technology centers. In order to accomplish this goal, the center will need to balance its primary agenda of providing free services to low-income participants with plans for expansion that would include serving others within the surrounding communities.

## Basic Strategies

### *Approach*

The Fast Forward Community Technology Center is located in the affluent Shandon neighborhood, where many members of Columbia’s small (10 percent) professional class live in stately brick houses on tree-lined streets. It serves an ethnically diverse, 40-square-mile area, including Bluff Estates and Arthurtown, two low-income neighborhoods. The center faces a continuing challenge of reaching out to distant, low-income communities, particularly after school, while also meeting the needs of the stakeholders in the immediate neighborhood.

To address these challenges, Fast Forward’s leaders have emphasized an inclusive approach that appeals both to poor families that lack the resources to purchase computers and middle-class families that lack the time to learn about the computers they have. Although the classes are free to all, Fast Forward recommends making some donation in exchange for taking a class if the learner has the means. Fast Forward also provides support to nearby key members of the community: teachers at Hand who want to learn more about technology, and senior citizens from a nearby apartment complex who want to learn about e-mail and the Internet.

Fast Forward’s approach to serving the poor has evolved over time. Originally, it planned to address adult literacy and GED preparation as well as technology training, but

found that there were already low-cost programs for these. Now, the focus is on building technology skills to support the education of poor children and to further the career goals of adults. Before founding Fast Forward, Dee Albritton, the director, participated in computer give-away programs serving the poor. That experience convinced her that access to computers involved more than simply giving people hardware: “We’ve got lots of access. What you need is ‘how do I use it?’” Thus to reach adults, Fast Forward favors structured, classroom-style programs in basic computer use. She has various anecdotes of graduates who have moved on to better-paying jobs.

Fast Forward’s location is to be both a blessing and a challenge. It is located in a small room at the rear of Hand Middle School, which is a secure location for the computers, but somewhat distant from the neediest segments of the Columbia community. In an effort to improve access to the center to the poor, volunteers from the local Shandon Presbyterian Church drive buses bringing youngsters from the historically poor Arthurtown community to the school. Furthermore, the local churches provide childcare for parents who are learning computer skills during weekends. Through outreach and transportation efforts such as these, the center has become one of the few places (if not the only place) where all segments of the local population feel comfortable coming together. Albritton is fond of telling the story about the day that the Columbia mayor’s wife and a group of homeless veterans were taking the same class.

Albritton has been resourceful in stretching her budget. Offering formal courses is costly, so there are only four paid instructors to provide courses to about 500 students. To take up the slack, Fast Forward uses volunteers to supplement the instructors’ services. There are eight regularly scheduled adult volunteers and about 15 youth volunteers, plus up to 30 or so drop-in volunteers. The summer program recruited about nine students from ages 9 to 13 to serve as youth volunteers. To prepare these volunteers, Fast Forward requires them to take a special “team training” course at Fast Forward to learn about software and computer troubleshooting. Last year, some of the youth volunteers won Presidential Community Service awards for the number of hours they put in at Fast Forward. This year, the summer program’s capacity was doubled, primarily by extending the program beyond the Fast Forward lab to include both Hand Middle School computer labs.

In a cost-cutting move, Albritton reduced the administrative staff budget from the original grant request. Initially, she requested a full-time administrative assistant and full-time outreach coordinator. However, there was so much demand for the center that significant outreach work was not required, which enabled her to combine the two positions into one.

Much of the budget has gone toward the computers. All of the computers in the center are new and were purchased with grant funds from Dell (the only company that offered them an educational discount). The center has more than two dozen Dell desktops connected to the school server, another dozen Dell laptops, and close to three dozen AlphaSmart portable computers (these are low-cost, one-piece units with LCD screens which display about eight lines of text; they are principally designed for simple word-processing). The desktops are used for classroom instruction, and the laptops are used primarily for the portable labs that go off site. Four HP DeskJet printers enable users to print reports and other materials. The center also has digital cameras and scanners, printers, productivity software, Lego Mindstorms robotics sets, and Lego Spielberg movie-making sets.

Oversight is handled through a four-person management committee that meets at least monthly; its members are Hand Principal Jeanne Stiglebauer, United Way Vice President for Resource Development Mike Gray, grants expert Elaine Delt, and Dee Albritton. In addition, a 25-member advisory board meets quarterly, composed of representatives from partner institutions such as the United Way and local churches, and parents and participants. There are three subcommittees that meet every six weeks to focus on specific issues, such as program sustainability, publicity, and technology.

An outside evaluator, Lynn Bailey and two assistants, periodically compile information about program use, the demographics of the participants, and client satisfaction. They have conducted four focus groups with class participants (1 youth group and 3 adult groups) and plan to conduct these periodically. The evaluators report that their feedback is used to make program improvements. They have been impressed with Albritton's willingness to adapt the program to their suggestions.

The center has been working within budget and is beginning to strategize and implement sustainability, for example, by offering fee-based courses for its middle class participants and replicating the program in as many as six new satellite locations.

## *Programming*

To address the needs of elementary and junior high school students in the region, Fast Forward has offered technology access to more than 300 students at Hand, and full-semester courses for computer introduction, keyboarding, and PowerPoint. It has also offered a transition course for more than 200 elementary school students moving into middle school, involving students in keyboarding, Internet searching, PowerPoint, and robotics. The center is open 13½ hours a day Monday through Friday. Saturday classes are available, and night classes are offered six days out of the month.

One program loans low-cost portable computers to students for writing school reports; 150 middle-school students had taken advantage of it in the first six months of the school year.

Morning sessions have been reserved for local preschools to use the labs. Children have structured play time with CD-ROM games under the supervision of their preschool teachers and adult volunteers. The software is selected and presented in an age-appropriate manner; groups of children and adults approve it before inclusion into the program. Games for practicing skills include Math Blaster, Madeline's Thinking Games, Madeline's Rainy Day Activities, Pixar Activity Center, and Chutes and Ladders. Other software programs include encyclopedias and other references on CD-ROM, Microsoft Office, and business graphics programs such as Print Shop (this program is one of the most often used). Simulations and exploratory software environments are being investigated, as is Web page development software. (There have been multiple requests for classes in Web design. The center's leaders plan to offer this as a fee-based course because they see their mission as providing "basic" skills only to the needy.)

Midlands Technical College teachers deliver fast Forward's adult classes using materials developed for college training courses. The courses are delivered in traditional lecture style, with an instructor demonstrating each step of using a software program on a large screen while individual students follow on their own computers. Since Fast Forward's adult programs reach out to those who have shied away from technology, either because of financial limitations or sheer intimidation, Albritton selects instructors who are "patient and kind." Instructors not meeting these criteria are not rehired. As a result, the center

has attracted a high quality set of part-time instructors, three of whom who have been honored as “Instructors of the Year” at their home institutions.

## **Success of Implementation**

Remaining nimble enough to respond to community requests for services is one key element of the success of Fast Forward’s approach. Finding teachers who can shift easily from lecture to one-on-one tutoring is another, particularly for reaching members of the poorest communities in Columbia. These two features of the Fast Forward program are demonstrated in several of the following anecdotes.

### **Reaching a Homeless Veteran**

As part of its outreach effort, Fast Forward sought referrals from a homeless veteran transition program, and this is how Justice D., a 54-year-old formerly homeless African American, came to the program. He has wanted to learn computers for nearly 20 years, but never did because he felt intimidated by traditional school environments and this new technology. It has taken six months of careful shepherding by understanding teachers, but today Justice can tentatively navigate through the Internet and compose brief notes in Word. Justice credits his instructors for his success. He particularly likes having an instructor who tells him what to do, step by step, and can help him figure out what he does wrong. Eventually, he wants to take more advanced courses, but for the moment, he prefers to take small steps – Introduction to Computers, Introduction to Word, and Introduction to the Internet. He explains his logic in taking the courses he has so far: “It’s still a little ball I’m trying to form,” Justice says, shaping his hands into the ball. “Hopefully, I can get a round ball.” In a year, he explains, he no longer wants to merely “guess” about what he is doing on the computer. He wants to “know.” Then when he reaches that point, he will feel better about signing up for classes and maybe even get a promotion to supervisor at the housekeeping department of the Veterans’ Administration, where computers are used to handle personnel requests and purchase orders.

### **Connecting Across the Ages**

Night classes have allowed the residents of a nearby senior citizens' home pursue a variety of pet projects, such as conducting family genealogy studies or organizing files for a book club. Seniors have made extensive use of e-mail to communicate with children and grandchildren. Since some of them find it intimidating to work on computers at public access locations such as libraries, where there are many younger, more technologically proficient technology users competing for access time, Fast Forward's classroom-style location offers them more a more comfortable environment. There is clearly potential for seniors to acquire more autonomy as technology users through their participation in the center.

The after-school program for middle school students has become a community unto itself—a place to “fit in” for some bright middle-class boys and girls. Brenda is a girl who would rather program robots than play with Barbie dolls. George has already taken the SATs in eighth grade, scoring 1280. They and another student, Charles, were among the first students to learn how to program Lego robots, and now they help younger students do it. They quickly explain the interface and functions of the Mindstorms software, and they describe the basic wiring structure that all robots share. The trio proudly shows off their next big project: a pet dog based on a robotic Lego dog created by some Japanese programmers. They show the picture of it they found on the Internet, and puzzle over how to understand its instructions, which are in Japanese. As they talk, they compare their learning experiences at Fast Forward to those at school. “School is boring,” Charles says. “And this isn’t school.” George chimes in, “You get food,” glancing over at the plate stacked high with cookies, a regular feature of Fast Forward. “You can talk and ask people questions,” says Brenda.

Programs designed to reach out to students have focused on building technology proficiency to support education. A Hand teacher has created a Flash Web page introducing different age levels of student to Internet browser use and navigation. Fast Forward regularly trains middle school students such as Brenda, George and Charles to become technology leaders. They learn to maintain computers, clean up cache folders, and fix up settings that younger students have changed. Charles routinely downloads drivers for peripherals from the Internet. All three of these students have reviewed

software intended for use by younger students. Over time, having these responsibilities has made all three feel a strong sense of ownership of the center. Several months earlier, the students composed and presented a PowerPoint presentation about Fast Forward to a local foundation. They won a \$2,000 grant for the program, and they got to sit on a “management committee” to discuss how to spend half of the money.

There’s also the AlphaSmart loaner program, focused on poor students in particular. One student, Whitney, said she had borrowed an AlphaSmart portable computer several times to write essays for class since the beginning of the year. Although her family has a computer at home, it is broken and they cannot afford to get it repaired. Whitney showed us an essay she had written called “What Freedom Means to Me.” She expertly demonstrated how to upload text from the AlphaSmart to a Word document on one of the center’s desktop computers. She knows how to use spellcheck, grammar check, and text styles; her mother helps her edit her essays. Whitney says she would like to use e-mail to share her essays with her father and grandmother, who live in different states. She is proud of her essays, partly because they express her feelings, but also because they look professionally formatted.

Fast Forward has also responded to school community requests for computer education. A case in point is Heidi S., a sixth-grade language arts teacher at Hand. Heidi, a slender, bespectacled, and loquacious woman apparently in her early 30s, says she came to Fast Forward when she began teaching at the school a couple years ago. She found the environment friendly and hospitable, and preferred going there to the school-based computer labs, which were not consistently staffed and where she was expected to solve technology issues on her own. Heidi calls herself an auditory learner, rather than a visual learner. She prefers to have people talk to her rather than read a help manual or engage in trial-and-error troubleshooting. Over time, she has come to use technology extensively with her students. She now regularly documents projects in her creative writing class with a digital camera.

The future of Fast Forward depends on its ability to sustain itself financially without federal funding. To date, it has functioned within its federally funded budget, but now Albritton has to plan for the future. The center is now offering fee-based courses, and aims to replicate its program in as many as six new satellite locations. The fee-based courses include a cyber-religion course and a family album course. In focus groups done

with adults, evaluators found that some adults would be willing to pay \$5-\$15 per course, but that many other adults would not be able to pay at all. One of the local Shandon residents said she would not mind paying a sliding-scale fee, particularly if it fell below the \$90-a-course fee charged by the local technical college.

Albritton also has begun making contacts with her network of supporters in the church community and city government. She keeps tabs on upcoming grant opportunities, and regularly partners with board member Elaine Delt to craft grant applications to keep the program afloat. In the past year, as the program's visibility has grown through awards from the Chamber of Commerce and SBC Telecommunications, Albritton has made the most of new contacts located through its publicity. One such woman, Linda Dennis, is the CEO and publisher of several national educational magazines including *PC Teach*, *PC Create It*, and soon, *Science*. Ms. Dennis originally contacted Albritton to do a feature article about Fast Forward in *PC Teach*. But after the two women met, they developed further collaboration for the benefit of each of their programs. Ms. Dennis was asked by the PTA to do a demonstration of PC Teach activities, and she decided to open up the demonstration to local schoolchildren. That idea developed into an event involving the Mr. Wizard television science teacher and several sessions over two days involving 22,000 Columbia, S.C. schoolchildren. Albritton agreed to find 60 adult volunteers to staff each session, which will involve 3,000 children apiece. In exchange, Ms. Dennis has agreed to donate art supplies and kits to an after-summer school program that will help parents send their children to Fast Forward's summer computer camp.

The center seems to be gaining acceptance in the community, in part because the awards and media coverage of Fast Forward enhance its visibility and make people aware of the program's contribution to the community. Several church leaders who helped sponsor the beginning of the program say that it represents a unique place where people of all ages can come together. Further, one church leader said it has made local community members "connect with the school," which some had previously seen as an imposition due to its traffic and noise. Some local schools have found that parents of students who have attended the Fast Forward summer program are pushing for improved computer labs at their school sites. In these ways, Fast Forward has connected with its diverse

community and has had some impact on expanding the awareness of the importance of technology education in the lives of all.

## Challenges to Effectiveness

The growth of the student population at Hand in recent years is putting pressure on Fast Forward. One big concern for the future of Fast Forward focuses on an upcoming bond measure that, if approved, would lead to extensive renovation work and possible dislocation of the program if the school needs to reclaim the space for a regular classroom.

But most challenges revolve around funding. Basic funding is not diverse; most of it comes from the U.S Department of Education, with in-kind contributions coming from Richland District 1, the Shandon Cluster of Churches, Midlands Technical College, and the City of Columbia. However the center has successfully pursued and won several other grants totaling about \$28,000. The Ronald McDonald Foundation grant (\$5,000 to \$6,000) provided funding for special needs software for visually impaired participants. The Nord Foundation grant (\$2,000) provided additional funding for new software. The Central Carolina Community Foundation grant (\$5,500) provided funding for summer computer camp scholarships and off-site computer moviemaking sessions one Saturday a month at a local ministry serving a community of Hispanic immigrants. The America Connects Foundation Innovation Grant (\$16,600) provided funding to create a database system in Access that helps community technology centers manage information about participants, classes, and donations.

One of the board members of Fast Forward, Scott Derks, of Bank of America, believes that growth is critical to long-term sustainability and will require new partners and new sources of funding. In the long term, Albritton wants to open a whole new line of six “hub-and-satellite” computer technology centers. Some centers may be in a neighboring county, Lexington, which is more affluent. This shift would provide more cash flow, but would dilute the focus on serving high-need communities. Still, center leaders recently secured a grant from the city to sustain this effort. One of the first satellites may open next year. Fast Forward would like to open up a CyberCafe near the Columbia high school, which may provide some revenue by offering fee-based services to the high school community that could contribute to expansion to needier areas later.

## 5. Community Technology Learn Center

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### **Literacy Volunteers of Maricopa County, Phoenix, AZ**

#### **Program Summary and Accomplishments**

The Learn Center offers basic education classes for young adults, out-of-school youth, and adults. The center was developed through partnership between the Literacy Volunteers of Maricopa County (LVMC) and Arizona's Department of Education. LVMC has used its CTC funding to create the Community Technology Learn Center in the diverse, low-income Christown/Westwood area of west central Phoenix. Today, with the help of CTC funds, the Learn Center is pursuing the LVMC's overall goal of achieving total literacy in Maricopa County, with computer literacy as part of this bigger picture.

The new center's individualized approach to achieving this goal draws upon LVMC's considerable human resource assets and its previous experience in running a community educational center. The Learn Center's goal is to ensure that students attain specified measures of adult-education achievement. The center has focused on providing highly individualized, learner-centered instruction—an approach that is supported by its large volunteer base, use of research-based software, and professional development opportunities that have made it a particularly successful CTC.

The Learn Center logged 9,812 hours of instruction from July 1, 2001 through February 28, 2002 for adult education classes, easily reaching the center's goal of 10,000 hours for the one-year period. The center has garnered awards and high satisfaction ratings; in February 2000, the program received the Secretary of Education's award for Outstanding Adult Education and Literacy Programs, and students report being excited and satisfied with the quality of the experience. The Learn Center has offered nine Internet classes, two Word classes, one keyboarding class, and one Powerpoint class. Between May 2000 and March 2001, 382 participants enrolled in these classes. Currently, the center offers three classes two days a week, and has plans to expand both the number of classes and the times they are offered. Classes are taught by certified teachers assisted by volunteer tutors (in the past year, 55 volunteers have been recruited). In general, the format of instruction is that students spend an hour learning with various computer

programs, then spend the rest of the class in small-group work. The center has 30 networked computer stations.

LVMC relies on its large volunteer base to allow efficiencies of scale, cost, and quality. In 2001, LVMC had more than 500 volunteers donate 34,180 hours of instruction program-wide. Its capable volunteers have enabled LVMC to offer individualized, learner-centered instruction, and LVMC has twice received national awards for exemplary program practices. Despite its rich base of human resources and other strengths, program staff and stakeholders nonetheless worry that many of the Learn Center's important services will be severely curtailed after federal funding ends because of a lack of other sources of support.

## Basic Strategies

### *Approach*

Literacy Volunteers of Maricopa County (LVMC) used its CTC funding to support a new Community Technology Learn Center in the Christown/Westwood area of west central Phoenix. The center is providing highly individualized, learner-centered instruction—an approach that is supported by its large volunteer base, use of research-based software, and professional development opportunities that set it apart from many other CTC sites.

The center was established in the light of a neighborhood survey by the City of Phoenix in which residents cited “space to learn English” as the top answer; instruction in literacy and English for speakers of other languages were among the top five priorities. Residents also responded positively to the idea of technology access and instruction. Impetus for the center was provided when the only adult school merged with Rio Salado Community College and closed its location in the neighborhood, leaving no state-funded adult-education provider in the area. Residents without private cars were cut off from adult education due to poor public transportation in the area. Many of the residents were without access to computers, except for time-limited sessions at local libraries.

In response to the situation, the City of Phoenix asked the LVMC to open a new center in the neighborhood. The LVMC was a logical choice: in 1987 it became the first community-based nonprofit organization to be designated as one of the state's “Learn

Agencies” (computer learning centers originally funded by the Administrative Office of the Courts, Arizona State Supreme Court). After determining that there was indeed a core group of potential students in the area, Lynn Read, the LVMC’s Executive Director, began searching for the resources to make the new center possible.

Today, with the help of CTC funds, the Christown/Westwood neighborhood Learn Center is pursuing the LVMC’s overall goal of achieving total literacy in Maricopa County, with computer literacy as part of this bigger picture. The new center’s individualized approach to achieving this goal draws upon LVMC’s considerable human resource assets and its experience in running the original Learn Center.

LVMC considers its large volunteer base to be its greatest asset, enabling efficiencies of scale, cost, and quality. Last year LVMC had more than 500 volunteers donate 34,180 hours of instruction program-wide. As a volunteer-based organization, LVMC is skilled at recruiting, training, utilizing, and managing volunteers, and has twice been recognized by Literacy Volunteers of America (national organization) with its top award for exemplary program practices. Prospective volunteers receive a 2-hour orientation; those willing to make the minimum 9-month commitment to volunteer 2-3 hours weekly (many give more hours than that) go through a 21-hour training before being matched with students. Continuing education for volunteers is provided through workshops and other professional development experiences. The majority of volunteers in the program work with students on a one-to-one basis, although volunteers also tutor small classes, do intake testing, matching, provide support to paid staff, and perform other duties as needed. The use of volunteers keeps LVMC’s cost per hour of instruction down to \$7.36.

The abundance of capable, committed volunteers enables LVMC to offer highly individualized, learner-centered instructional services to help each student address individual needs and goals. Some 24% of LVMC’s instruction is between volunteer tutors and students in one-to-one settings where the curriculum is highly individualized. Students have the choice of computer-assisted instruction and small classes led by teachers and trained volunteers on topics ranging from math, ESL, and computers, to civics instruction, such as using community emergency services. Each student works on an individual computer, and volunteers try to help students make the most of computer-assisted instruction opportunities at both Learn Centers (although volunteers do not yet seem to be widely used in the new CTC-funded lab that focuses on technology skills). As

space allows, students may choose to repeat classes until they feel that they have mastered the material.

Subject matter is also selected in response to participant interest: an emphasis on basic English language skills addresses the expressed needs of the community, and the inclusion of a specialized civics curriculum is also at learners' behest. Peggy Maher, lead technology instructor, also builds opportunities for students to apply the skills they are learning, such as Web design, to personal interests (a business, a social cause, a hobby, etc.).

In support of the individualized instructional approach, students are assessed when they enter the program and at six-week intervals thereafter. Each student has a consultation with a teacher; together they discuss the student's interests, needs, and goals before developing a plan for instruction. Staff use the Tests of Adult Basic Education (TABE), which is mandated by the Arizona Department of Education, for initial assessment, and input the raw score into an assessment component of the New Century program, which tests the student and determines suitable lessons for the student. Formal educational outcomes are tracked for participants in the adult education programs. Although many of the students in the basic computer literacy courses do not have formal educational goals, as more ESL and adult basic education (literacy and GED) students begin taking classes in the tech center, this may be changing.

As an established agency, LVMC possesses other resources that are also of value to its CTC operation. They include staff with expertise in testing, a history as a software beta test site, and established intake procedures. For example, the organization uses its existing intake office and testing staff to serve students in the new center, making the most effective use of its resources. LVMC also enjoys community support through a variety of relationships: the Nina Mason Pulliam Charitable Trust, the City of Phoenix Neighborhood Services Department, the Arizona Department of Education – Division of Adult Education, local elementary schools, the Volunteer Nonprofit Service Association, the Arizona Republic (newspaper), and corporations such as Novell and Microsoft.

The original LMVC-operated Learn Center's experience with instructional software and hardware is another valuable resource. The program's visibility helped it become a beta test site for a variety of software for adult education. As a result, the teachers became familiar with what's available and were able to select software based on its suitability for their students' needs. Staff and volunteers also monitored students' interest, satisfaction,

and educational gains with the software. This experience informed planning for the new CTC-funded center (although teaching office application software, Web design, and the use of the Internet is new to LVMC). LVMC's previous experience also greatly facilitated equipment selection for the new site. For example, the LVMC leadership had learned important lessons, such as selecting new computers under warranty, rather than refurbished computers, and ordering hardware from a manufacturer who could replace defective parts quickly.

Unlike many other CTC programs, the LVMC staff has extensive professional development opportunities—another factor that supports its targeted instructional approach and its effectiveness. In addition to rich internal professional development resources (some teachers complete the 23-hour tutor training workshop for volunteers, for example), staff members attend many national and international conferences, such as TESOL in Vancouver, Even Start in San Diego, and the International Dyslexia Conference in Albuquerque.

One other element of the program's strategy for success in attracting participants, is its close relationship with the Phoenix Neighborhood Services Department (a city staff person uses an office in the Learn Center building) which helps LVMC with its neighborhood outreach efforts, such as distributing flyers through elementary schools in target neighborhoods. Sharing their space with the Maricopa County Adult Probation Department so that staff can meet with their clients in the neighborhood resulted in client referrals to LVMC classes by probation staff.

### ***Programming***

The center is convenient to residents of three area neighborhoods. The center is open from 9:00 a.m. to 8:00 p.m. Monday through Thursday and from 8:00 a.m. to noon on Friday; it is not available on weekends. Class size, especially for computer classes, is limited so that everyone can work on their own computer. Open access is only permitted during some classes, when supervision is available; there are plans to expand the number of open access hours this year. The center does not currently have any laptops or other computer equipment available for loan to students.

The Community Technology Learn Center consists of two computer labs and two classrooms. The classrooms are used for the small classes in ESL, math instruction, and

other topics. One of the labs, originally started through funding from the Nina Mason Pulliam Charitable Trust, focuses on adult basic education, ESL, and GED through a combination of computer-assisted instruction and instructor-led small classes. A teacher is available to assist students and teach small classes; volunteers provide backup and also offer classes and individual tutoring. As of March 2002, a total of 903 students had enrolled in adult education classes and had 30,007 hours of instruction.

The CTC lab offers 6- to 8-week long, instructor-led computer classes in 2-hour blocks devoted to basic computer skills such as Microsoft Word, PowerPoint, desktop publishing, Internet, advanced Internet/research, and Web design/open lab. As much as possible, courses are moved to different time slots to accommodate participants' schedules. As of March 2002 a total of 325 students had participated in technology classes; they had 3,956 total hours of instruction.

Instruction in the small classes reflects the sequence of skills specified by Arizona standards for adult education, and the technology instruction allows students to start with computer basics and progress to more demanding applications. The primary opportunity for project-based learning is the Web design class, where students are exposed to the basics of creating a Web page using a template (GeoCities); they are also exposed to some resources for customizing their sites with clip art, animation, and sound files. Each student is encouraged to apply his or her skills in creating a personal site. Prerequisites for the Web Design course are the Computer Basics and Advanced Internet courses.

Instructional plans vary with learners' needs. Students who are ready to prepare for the GED are introduced to the appropriate level within the New Century Education integrated instruction software; they work individually through the units under the supervision of the teacher at the center. Basic literacy students may work with the New Century Education software and with an individual tutor. Low-level ESL students typically spend an hour working with the Rosetta Stone software and put in additional time in a conversation class. Other ESL students work individually on the ELLIS software and take part in other classes as suits their needs and interests. The adult education programming helps ESL students build the communication skills needed to take the computer literacy courses. Some students are also taking advantage of a new curriculum that combines basic ESL instruction with learning to use computers. The curriculum is being developed under a grant from the America Connects Consortium.

The physical layout of the center facilitates the variety of learning activities. Six workstations are arranged in circular fashion around a utility pole in the center of the room; 11 more workstations face the side and back walls of the room. An open hallway at the back of the room separates the lab from the two classrooms. Each classroom is nearly filled with a conference table and chairs, and whiteboards adorn the available wall space. To the left the hall leads to the CTC-funded technology lab. Twelve computers are arranged on gray composite computer tables in pairs, with slide-out keyboards underneath.

## Success of Implementation

All programs are targeted to adults (many of technology students are senior citizens), and the center appears to be successfully meeting the general requirements of adult learners and the particular needs of the residents of Christown/Westwood. For example, students enrolled in the adult education classes achieved the educational gains required by the Arizona Department of Education, Division of Adult Education. As for meeting participants' particular requirements, one is the need is for a safe and comfortable learning environment. For most of LVMC's students, it takes courage to enroll in courses. Immigrants taking ESL courses, adults taking basic literacy or GED courses, and seniors taking computer literacy courses often come through the door apprehensive about whether they can learn. If the staff is not sensitive to such concerns, one bad experience can end an adult's commitment to increase his or her knowledge and skills. In course evaluations, students consistently state that they feel comfortable with their teachers and see this comfort as critical to facilitating learning. In a typical pattern, especially for Hispanic families, a daughter in her early 20s might sign up for ESL and then bring in a parent, after assuring the parent that the center was a comfortable place to learn. Students thus have been serving as the LVMC's "publicity and recruitment machine," bringing in family and friends to the center.

Along with the quality of instruction, close relationships among students, staff, and volunteers, are key to the center's successes. The participants we interviewed lauded Sue Inman and other center teachers for their abundance of patience. The students appreciate

the opportunity to work at their own pace and to come to the center for extra hours when needed.

Peggy Maher, the main technology instructor, epitomizes the patient, caring approach of the staff. Maher, who started her career as an elementary school teacher on an Indian reservation, took course at a state university on how to use the Internet. She found the teacher arrogant and condescending and left feeling badly about her ability. She vowed that if she ever taught technology she would make it “user-friendly.”

Students verify that she has kept her vow. Learn Center student Barbara Bond, a senior, described Maher as “very patient” and “good at sharing her knowledge.” Bond first tried to learn to use her home computer, a gift from her children, by taking a course at a local college. She said she did not learn very much because the course was short-staffed and students did not spend enough time doing hands-on activities. She heard about the classes at LVMC from a friend, and decided to enroll. Learning to use computers at the Learn Center, Bond says, has “turned her world upside down” and she attributes her learning to Maher's patience. Bond says that the senior students need to have information repeated and Maher meets this need. Maher speaks slowly to allow note-takers time to write. Bond and another student we interviewed each mentioned with pride the fact one notebook was already filled with all that they had learned. Bond puts her trust in Maher when problems arise; whereas she once tried to fix problems herself, she recognized that it was better to wait for Maher to come around to help her. Bond said Maher generally gives her two ways to solve the problem. Bond notes what she has learned so that she can reference the solutions at home where she can't simply raise her hand in order to receive assistance.

Maher has helped build a sense of community among center participants. When some of the senior women wanted to know how to buy a computer, Maher taught them about the specifications they should consider and they all went shopping together. Although Maher herself is a rich source of information on Web sites, free clip art, and other Internet resources of interest to students, she has noticed that they help one another as well. This help extends beyond the boundaries of class content. For example, one of the students gave Penny Jones, who is legally blind, a ride to Penny's bus stop just to make her day a little easier. When a diabetic had an attack during a class, Maher said the others rushed to help, and one woman retrieved a health bar she carried in her purse. Overall, there is a

sense of camaraderie and a warm, inclusive feeling in the lab—even with the participants' diverse interests, capabilities, and backgrounds.

In addition to teaching basic hands-on computer skills, the center's staff has been able to facilitate critical thinking and project- or problem-based learning. For example, Maher includes assessing the validity of information on the Internet as a topic in her Internet courses. During our observation, she directed students to do a search on the term "diabetes." She had them do the search more than once, using advanced searches, including domains. She then asked them to look at the differences between Web sites in the .edu domain and the .com domain. During the Web Design course we observed, the class discussed ways in which their own Web sites might be found by a search engine. Because a technical explanation of how search engines accumulate URLs can be difficult to understand, she shares with students her image of a robot that is constantly moving through the network of wires to collect the site names. In general, Maher tries to use images and analogies to convey technical information to her students, for example, comparing a computer mouse to a steering wheel. She is not a technical person herself, but tries to ensure that her students also have at least a conceptual understanding. It was clear that students appreciate Maher's explanations.

Students are applying what they learn to tasks and projects outside of the center. One of the younger students mentioned that her ability to use the computer at work had grown. Barbara Bond, the senior student, said she can save time now that she has a mail merge file for her Christmas card mailing list. Maher helped Bond when she had a problem setting up the mail merge on her home computer. Students we interviewed all described competence they had developed in troubleshooting problems with their home computers. Penny Jones had purchased her computer with the expectation that her brother would help her learn to use it. Instead, she found he did not seem to have the time or ability to show her what she needed to know. Now that she has learned basic skills and troubleshooting in the LVMC classes, she said that her brother takes her desire to use a computer more seriously and is more willing to try to teach her what he knows.

Many of the seniors who have taken the basic computer literacy courses did so because they had computers, often, like in Bonds' case, gifts from their children. It was clear how proud they felt about joining the computer literate and how pleased they were at impressing their children and grandchildren with new skills. Students seem pleased to

learn each skill and the senior women in the Web design class we observed took great delight in the animations they saw on the Web sites they were reviewing. The opportunity to use graphics and animations on their own Web sites inspired them—in contrast to the annoyance those same things bring to many experienced computer users.

Maher teaches students in her Web Design course the basics of color and font choices; esthetics of layouts; uses of photographs, graphics, and animations; and the central purpose of clear communication. In the Desktop Publishing course, students learn to design calendars, greeting cards, and imprint T-shirts. Penny Jones told us about the Web site she had designed. Because she is legally blind, she said she was particularly careful to follow Maher's guidance on designing for readability. She also adhered to the guidelines for varying the color of fonts according to meaning, and choice and placement of graphics. Students in the Web design course sometimes attend for their own business needs. A carpenter created a site to advertise his business; another student made a site to advertise his friend's pen sales business, and is thinking about gaining employment by designing Web sites.

Both students we interviewed, Bond and Jones, indicated that their learning was having an impact on their lives. Bond's children do not live nearby and wanted their mother to stay in touch using email. Now that she has learned to use her computer in LVMC courses, Bond says she is in regular contact with her children and grandchildren and learns about even the minor daily events in their lives. Jones also uses email to communicate with family and friends, and with groups addressing the issues she cares about.

Many of the students in the basic computer literacy courses recognized the benefits of computer literacy in terms of employability. For example, Isela Guillen, who is a low intermediate ESL student pursuing her GED, takes Maher's Basic Internet class. She comes to the center 10 hours a week and definitely wants to improve her employment situation; currently she volunteers in an office. Staff commented that the majority of their students would not necessarily dramatically open up new career opportunities, but that they would be able to upgrade their positions within the companies they worked for (for example, hotels), or move from very low-paying jobs to ones with better pay and working conditions.

The staff stated that most students advance in their skills (in language, academics, or technology), yet acknowledged that drastic advances in job or social position as a result are more difficult to attain. Nonetheless, the achievements of so many students impress the LVMC staff, the students themselves, and their families. One student started her own janitorial business and now services the LVMC facilities; another became LVMC's data specialist with her new computer skills. Another student, a carpet layer who dropped out of high school, made an agreement with his son, who was about to drop out of high school himself, to stay in school if he would get his GED. They both succeeded.

In addition to upgrading skills, the LVMC program has generated other benefits for neighborhood residents. For example, the center offers neighborhood residents meaningful volunteering opportunities close to home. Tutor training workshops were offered in the neighborhood and 35 new volunteers began working with students at the center. There are other types of benefits generated by the center. As part of the adult literacy courses, LVMC has invited guests to speak to their immigrant students to help them understand life in Phoenix. Because authority figures are sometimes feared in Mexico, for example, firefighters and police officers have come to the Westwood center to explain their role. In particular, instruction in the use of 911 for emergencies made an impact on the students. There had been a misconception in the community that one should not call 911 because of illegal or even legal immigrant status. Although some of the topics of interest to the adult literacy students stray from the central purpose of LVMC (CPR training, for example), the center has accommodated these interests.

Overall, much of LVMC's successes can be attributed to savvy management by Lynn Reed, the executive director. She has used her knowledge of the nonprofit world, her experience with LVMC as a board member, and her network in the community to bring the agency's budget out of the red and to build a more stable and diverse funding base. She has also hired qualified staff and has given them authority to implement a successful program. She would be quick to identify her highly trained staff (many of whom have master's degrees) as critical assets. Reed, who says that her job is to manage the money and to let the teachers teach, imparts a passion for teaching technology in a way that is accessible and empowering for adult students—a philosophy that is grounded in her own experience as a student of technology. It appears to be working.

## Challenges to Effectiveness

The LVMC learn center will continue to bring meaningful technology services, integrated with other adult basic education and ESL programs, to the residents of West Phoenix. However, some of these services will likely be cut back with the end of the Department of Education's CTC program grant. Reed notes she has sleepless nights about gaps in funding, but it appears she continues to remain hopeful that she can find a ways to keep all programs running. She has proven skilled at both raising and managing program funds. At one point, when she thought that their third year of funding through the CTC grant was in jeopardy, confirmation came that the state would be funding civics courses for adult learners. Because they had already started civics lessons at LVMC, Reed earmarked those funds as \$80,000 of the \$120,000 needed to run the tech center. When the CTC program funds did come through, she was able to put the \$80,000 state funds and the additional money she raised from private foundations towards program improvements.

The center is determined to avoid making any commitments that would stretch its resources too thin. It is also looking for a way to avoid testing students who do not participate in center programming for the minimum of 12 hours of instruction required in order for them to be counted by the state. Since the primary reason for student attrition is lack of sufficient time for studying, Lynn has begun to address this by adding a set of screening questions to conversations with prospective students so that they can defer joining the program if they do not have time to fully participate. This practice will also result in less volunteer burn-out; new volunteer tutors often get discouraged and quit themselves if their first student drops out of the program.

## 6. Community Technology Centers of Flint

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**Mott Community College, Flint, MI**

### Program Summary and Accomplishments

The Mott Community College (MCC) CTC program provides technology and educational programming to three communities in Flint, MI through its partnerships with the Great Lakes Baptist District Association (GLBD), the American GI Forum (AGIF), and the Flint Disability Network. The centers serve the diverse residents of the city, which has suffered severe economic setbacks in the past few decades and is trying to use the new technological economy to “reinvent itself.” A key element of this economic strategy is the Regional Technology Center, an 180,000 square-foot facility located on the MCC campus. Supported by a grant from the National Science Foundation, the center offers student-tailored modules for programs within MCC’s Technology and Information Technology divisions, including automotive technology, design engineering, electronics, robotics, mechanical engineering, quality assurance, and information technology, as well as the country’s first Manufacturing Simulation Technology degree program. Programs offered through MCC’s CTCs are considered stepping stones for many in the community to the types of training offered by the regional center.

By the end of its second year, Mott’s CTCs had served over 4,000 participants through structured programs, open access hours, and introductions to new technologies. The CTCs have also provided a connection to the admissions processes and course offerings of the college, enabling many low-income people to participate in college programs within their local communities. CTC TV—providing PBS-developed telecourses in conjunction with the University of Michigan at Flint and the cable company Comcast—is being offered via cable through several community-based organizations and higher education satellite locations. In addition to computer skills training, the centers have been particularly successful in offering job placement services for many unemployed individuals in the area and access to assistive technologies for the disabled. The Disability Network Center has identified and developed a model for CTCs to become more self-sustaining through consulting to employers and individuals on the

use of assistive technology. The centers provide 18 networked computer stations and numerous additional assistive technology devices.

Although MCC has been successful in securing additional funding for the programs beyond the Department of Education grant, its CTC program still has several obstacles to overcome. One of the three centers, in particular, has not been able to attract significant numbers of participants. Another center's opening was delayed because of timing associated with finding, securing, and remodeling a new facility. The success of the three centers at preparing participants to enter the more advanced training offered at the Regional Technology Center depends on conducting the right types of outreach and providing the right types of programming to attract and retain those who will most benefit from these services.

## Basic Strategies

### *Approach*

Through most of the past century, residents of Flint, Michigan—an ethnically diverse city of approximately 136,000—enjoyed a growing economy fueled by an abundance of jobs provided by General Motors. About an hour's drive northwest of Detroit, the city provided well-paying jobs to community members of varying skills and education. Maintenance workers with enough experience, for example, could earn more than \$50,000 per year. The ready availability of jobs for semiskilled workers meant that relatively few residents felt the need to pursue higher education to earn a good wage. In reflecting on those years, Flint residents today will often let a visitor know that “times were good.” In the 1960s, the fortunes of GM—and the city of Flint—began to change. Flint is still struggling to recover from the loss of thousands of automotive-industry jobs, from a high of 86,000 to approximately 25,000 today. Generally, the jobs that do exist pay lower wages, have few benefits, and little or no security. Although overall rates of employment in southeast Michigan have rebounded somewhat, high unemployment still exists, especially among young people (16–24 years) and African Americans (male and female). For significant sectors of the city's population, the GM plant closings and other forms of fallout from the economic downturn have left many without jobs, without

academic credentials, and without a suitable support system for gaining new skills, particularly for the information age.

Despite its difficulties, the city of Flint is working hard to meet its challenges by, as one leader put it, “reinventing itself across the board.” The centerpiece of this effort has been to create an educational infrastructure that can produce a technologically literate workforce capable of attracting new manufacturing and information-technology employers to the region. Mott Community College’s CTC program represents the front-line of educational services: through CTCs strategically placed in the heart of the communities they serve, the college can offer courses that serve as stepping stones to more advanced training available (available, for example, through the new Regional Technology Center). The aim of these training programs is to retool the area workforce; CTC program staffers cite Dr. Felix Chow, the new superintendent of Flint’s public schools, as saying that a two-year technology certificate will yield better pay than a four-year degree.

The Regional Technology Center, created to serve residents of Flint as well as the surrounding townships in Genesee and Shiawassee counties (a metropolitan population of 470,000), is a \$40 million, 180,000 square foot facility located on the MCC campus. Supported by a grant from the National Science Foundation, the center offers flexible, learner-centered modules for programs within MCC’s Technology and Information Technology divisions, including automotive technology, design engineering, electronics, robotics, mechanical engineering, quality assurance, and information technology, as well as the country’s first Manufacturing Simulation Technology degree program. An “open-entry/open-exit” system—part of a specialized workforce-training curriculum developed using \$1.7 million in funding from the C. S. Mott Foundation—allows students to begin or complete a module at any time and is customized to meet students' specific needs according to their demonstrated skills and abilities.

In developing plans for the center, leaders at MCC looked for intermediate measures the college could take to improve the regional center’s usefulness and success. They decided that in the short term it was important to provide basic technology training to better prepare participants to take advantage of programming at the new regional center. They also hoped that they could encourage a wide representation of community members to develop an interest in computer careers by reducing fears and helping individuals recognize their own capabilities to learn to work with technology.

Mott Community College has developed its CTC program by introducing the idea of computer access and skill-building through trusted community leaders and organizations. Its partnership with the Great Lakes Baptist District Association has provided MCC's link to the African American community in the city's North Point area; the support of the association's pastors has been critical. GLBD seeks to provide computer access and technology skills to individuals seeking jobs or further education, seniors wishing to broaden their horizons, and children and youth in need of academic enrichment. To reach Flint's Hispanic community, MCC's leadership partnered with the American GI Forum, a Hispanic veterans' organization. AGIF has long seen its mission as promoting education within the Hispanic community; the CTC and its new building allow AGIF to broaden its social services and provide space for the community's cultural programming. MCC's partnership with the Disability Network has been a means both for reaching the disabled population and for using the Disability Network's expertise to ensure that any community center funded by the grant would have the assistive technology needed to serve anyone. The Disability Network CTC provides access to assistive technology and serves as an advocate for the use of assistive technology.

Having succeeded in developing strong partnerships with community organizations, the college is "supporting the effort of [the CTC] program 100%," according to Judith Cawhorn, MCC Executive Director of Grant Development. Mark Hope, the college's Director of Information Services, planned the technology infrastructure, opened the college's network for the centers' access and use, and committed the resources for ongoing technical support for each center. In addition to obtaining funding through the Department of Education's Community Technology Centers program, the college has received other substantial grants to support center programming, has issued bonds to generate funding locally, and has considered pursuing a millage issue to provide additional funds.

One of the most important resources the college has committed to the community technology centers is Project Director Robert Matthews, who was transferred to the project from the college's student advising staff. A lifelong resident of Flint (except for law school), Matthews has a deep knowledge of the community, along with the interpersonal skills to work effectively with the partner organizations in the project. Working closely with Matthews is Leon Collins, who comes to the CTC program after

years of experience in PBS programming. Collins assists Matthews by creating project-wide resources such as brochures and videos. Because of his extensive technical background and experience in educational programming, Collins is able to provide informal professional development for the centers' staff through a mixture of presentations at meetings and individual mentoring.

Both in word and in deed, Matthews and Collins reflect the college's position that although the MCC is actively involved in establishing and maintaining the three community technology centers under its purview, each of the three community organizations are the "real owners" of the technology centers. Matthews and several of the MCC's administrative staff reiterated the idea that the college's role is to provide support and technical assistance for the three centers. Part of the college's motivation in encouraging the independence of each CTC stems from its expectation that each center will eventually become self-sustaining. Toward this end, MCC has invested a considerable amount of time in supporting general organizational development for each of its partners. Matthews explains the strategy underlying the MCC's efforts: "A lot of what is happening and what has happened is really capacity building for the organizations, identifying the unique needs that their constituents have."

As a result of the CTC project, for example, the AGIF has developed new relationships with the Hispanic Club at MCC and the Hispanic Chamber of Commerce. The AGIF also has acquired non-profit status and, with encouragement from Matthews, the organization's leaders have enrolled in a course on non-profit management. Similarly, the GLBD leadership has formed a new, non-profit organization, the Faith Based Development Corporation, specifically to address issues of technology access and training for its affiliated congregations.

Perhaps the most distinctive feature of MCC's CTC program is its strong emphasis on including individuals with disabilities in the region's workforce. Michael Zelle, Executive Director of Flint's Disability Network, speaks articulately of the center's role in providing access to assistive technology, but he has a broader vision as well. He wants to see that CTC grantees, among others, have access to assistive technology and knowledge of available resources, such as the federally-funded Centers for Independent Living (300 in US) which may have access to AT loan funds. The Disability Network's vision of assistive technology is to find solutions (usually the right interface) that enable individuals to use

regular software applications. Sometimes the solution is as simple as showing someone the accessibility features the software they are already using.

MCC's partnership with Flint's Disability Network has placed its community technology center in the public eye. Michael Zelley, serves on local, state, and national workforce development boards, and also chairs a national blue ribbon task force on digital divide issues and the disabled population. Zelley's nationally recognized expertise may have been a factor in President Clinton's visit to the Disability Network's technology center in September 2000, during which he surveyed the center's impressive variety of assistive technologies. Robert Matthews and other college staff believe that Flint's visibility in this arena is enabling the Disability Network center to make an impact on the delivery of technology access and workforce development to the disabled population. With current projections indicating that the need for assistive technology will increase 20-40% over the next decade, the Disability Network's expertise in matching individuals and employers with the best assistive technologies for their needs will be a significant community resource.

### *Programming*

Involvement from all three community organizations—the GLBD, the AGIF, and the Disability Network—has allowed MCC to operate three distinct centers serving the needs of diverse populations. Located in the heart of the communities they serve, the centers offer basic and intermediate technology training, several types of computer-based training, art software, Internet access, open access hours, and a new federally funded job-training program, Career Path Education (CPE), which includes use of PDAs in class activities. The centers also offer access to the college's classes, administrative offices, and advising services through Internet and videoconferencing options for those not able to make the long bus ride across town to the college. A new feature of the center's offerings are telecourses provided by PBS's "Going the Distance" online adult education programming, presented in collaboration with Comcast and University of Michigan at Flint. One center staff member said that a big draw for the telecourses is the wireless keyboard; he added that the connection between the PBS show and Web sites "makes it fun – reels them in." In all its programming, the three centers work to serve single parents by providing classes for children and adults simultaneously.

Each of the CTCs now has funding for a full-time site coordinator and two MCC work-study students (25 hours each per week). Darwin Hamilton, the site coordinator at the GLBD, has been with the project since its inception, overseeing the transformation of an unused building into the CTC, securing donations of \$2,000 apiece from the congregations of 20 neighborhood ministers, and working closely with participants to develop programming that best meets their needs. Learning activities at this site are based on basic technology training, specialized courses, summer camps, workshops, and the individualized use of off-the shelf software. Center staff members find out what participants' interests and needs are and then sit them down in front of an application – learning games are popular.

Programming at the Disability Network center, run by Josh Peelman, includes basic computer and Internet training and well as specialized training in assistive technology, provided through workshops and one-on-one consultations. Participants in open-access hours at the Disability Network are given multiple assistive technology solutions and encouraged to try them out and evaluate them for themselves before making a decision about which to buy. The AGIF, under the leadership of Ismael Bermudez, is developing its programming to reflect a broad range of training in basic skills, specialized uses of media and digital technology, and the creation of content relevant to the interests of the Flint's Hispanic population.

In addition to computers, printers, scanners, and basic peripherals, each center has videoconferencing equipment for accessing courses at MCC. The Disability Network Center has a range of assistive technologies, including:

- WiViK—on-screen keyboard software
- Head Master (Head Tracking Mouse)—hands-free pointing device
- DynaVox—communication software using picture-based point and click access
- BAT One-Handed Keyboard—replicates all functions of a full keyboard
- MAGic 6.2—Screen magnification system with speech
- Braille Embosser—allows converted text files to be printed in Braille
- Kurzweil 1000—converts printed words into speech
- Cyberlink—uses electrical signals from the brain to control the computer

Because they are more affordable than standard computers, the MCC centers are introducing handheld technology to participants. Beyond simple time management, the center's programming with handheld devices focuses on other functions such as keyboard input, use with digital cameras, and access to the Internet.

## Success of Implementation

During our visits to the centers, we heard from participants that they have been able to succeed because of the special care and support they receive from the staff. Personable and caring staff make Pauline Douglas feel welcome at the Great Lakes Baptist Center. A retired GM worker, Pauline found out about the CTC through the Haskell Senior Center. She has been coming to the CTC for 6 months, usually once a week, and often brings a friend. Pauline said that she likes the "friendly atmosphere." Her goal is to buy a computer of her own. Pauline uses Hotmail as her email application and likes to forward jokes to her friends. Her strategy for problem-solving, she says, is "When I get lost I go back." Site coordinator Darwin Hamilton relates a story about Mrs. Kendo, another senior participant at the GLDB, who was initially terrified of computers but now uses MS Word, from letter wizards to blank documents. Geri Joiner, another senior at GLBD and a former teacher, has purchased a home computer. Five MCC students come to the Disability Network CTC to use the graphics software available; for example, James, a student, puts fliers together for church programs.

Josh is the coordinator at the Disability Network and has been there for 14 months. He was originally a work-study student at the center, then returned to school in September 2000 after a kidney transplant. His personal experience with limitations resulting from transplant surgery has given him a special affinity for working at the Disability Network Center. He reports that the hours of use per participant have gone up since December, even though he has not done any volunteer recruitment during that period and there have been fewer volunteers to support the participants. It may be that the participants are comfortable using the center on their own. He tells the story of Douglas, the first participant he worked with at the center. Douglas wanted to be understood orally. He started with the HeadTracker and onscreen keyboard (Intellikeys); he wanted to work on reading and spelling. He began typing 3-4 pages per day, and

programmed all the pages he wanted on his own (DynaVox was the application he used). He had no computer skills when he started; now he trains other people.

Margot Brummet, a senior participant at the Disability Network CTC, says her two main interests are writing and the internet. She works on a newsletter for the AARP during free access time at the center, and stays in touch with family members through email and e-cards. Margot values having someone around to help her at the center; she also spoke of the family aspect of the network as helping to dispel any phobia about using computers. She feels her enhanced technology skills will help her “stay off of the margin” as “everyone gives their WWW address today,” and “it is important now in the world today.” At one point she was bedridden and wanted to communicate with other people, and the computer has helped her do that – “for people with disabilities, it is a ticket to the outside world.” She believes that the Internet has started a “people’s revolution.” For example, she uses the Time Dollar Project through the Internet, which allows her to exchange volunteer hours for services she needs. This, she points out, is a very valuable service for seniors living on disability.

The Disability Network Center performs a valuable service in spreading the word about assistive technology, providing access to prospective purchasers of the equipment to try it out and find the best technology solutions for them before they buy. They also advise people about the assistive technology loan fund, which has easier requirements and a long pay back period. The right assistive technologies are important for disabled individuals to participate equally in the digital world, as well as the workforce. Josh told the story of a center volunteer who had been unemployed for some time, but then found a job in the computer field because of the technological knowledge and experience he acquired at the center.

One main benefit of the development of the three MCC centers is the strengthening of the local communities. For the AGIF, for example, planning for the technology center has spurred the development of a full-service center for the Hispanic community, with a variety of educational, cultural, and health programming implemented onsite. As they establish their new CTC, having a physical space for services, programs, and meeting will greatly benefit their ability to network with other Hispanic groups in the community. A physical gathering space may also encourage sharing of resources and needs, including needs for new volunteer leaders. One of the American G.I. Forum’s board members

spoke of the center as a new model for “la plaza,” the traditional Hispanic community gathering place.

Reflecting both satisfaction with their efforts to date and the long-term confidence the MCC leadership places in the technology center program, Judith Cawhorn restates the program’s aims with regard to the Regional Technology Center:

We recognize that the folks that are going to access these high-tech jobs will come to the doors of the RTC with all kinds of different levels. Some will come fresh out of high school, out of these tech prep programs that we’re engaged in to help students understand working in manufacturing technology and information technology is not just dirty-fingernail jobs, but it’s really good professional jobs. But many more will come from a group of folks who have limited skills. They’ve been production workers. So we want to make sure when those doors open that we really make a dent in the folks that are at the lowest economic rung of the ladder in the community, and that they are able to leapfrog into those higher-tech jobs.

Cawhorn’s comments ring true with what we observed at the centers: slowly people who are at the “lowest economic rung” are confronting the importance of informational technologies to participating in contemporary life, and using the CTCs to address their needs for training.

### ***Challenges to Effectiveness***

Although program leaders have great optimism, they also realize that, for a community like Flint, the process of introducing digital technologies is one that is long and slow. Several people with whom we spoke identified a key obstacle to greater use of the GLDB center: fear. Robert Matthews expresses it as follows:

[We are] working to overcome some of the initial fears that people have about this technology thing. What does this really mean to me? Well, I know everyone uses computers, but what does that really mean? And to be quite honest, particularly in our community, I think there are some—there are some fears of just the whole notion of technology being intrusive and everyone knowing your business and that sort of thing, people feeling like can I really—can I make a mistake? That sort of thing is there. Can I mess something up?

Matthews identifies three types of fear discouraging use of technology in Flint: community members' fear of the unknown, their fear that information technology could be used against them, and their fear of their own inadequacies in learning to use computers. Matthews and others recognize that combating these types of fear takes time.

Meanwhile, levels of participation are still relatively low compared to the centers' capacity. Nonetheless, many in the community see the centers as their communities' best hope. All three center coordinators recognize the importance of improving staff capability to develop curricula and programming. Reverend Threlkeld, a local minister serving with the GLBD Association, speaks with excitement about the center, recounting the "fall" of the city of Flint and how the center project is an important step toward helping the African-American community get back on its economic feet again. Reflecting on his own congregation's participation, he looks forward to raising the funds needed to see his photograph on the wall along with those of the other ministers who have contributed substantial funds.

The financial status of each of the three CTCs is different. The Disability Network center has benefited from its allocation of state funds and seems to have a viable plan to provide consulting services to corporations about appropriate assistive technologies for disabled employees. The other two centers, however, will shortly be independent from MCC. Robert has provided organizational consulting to each host agency in hopes that they will be able to increase their own resource development efforts during the transition.

Still, each CTC is benefitting from MCC's successful efforts to develop programming and funds. In addition to the CTC grant, MCC is the recipient of a \$411,567 federal Technology Opportunities Program grant to fund its Career Path Enhancement Project. The CPE program will provide a structural learning program at the centers, targeted at providing access to technical jobs. MCC also received a \$60,589 Access Business and Professional Volunteer Corps grant to establish a professional volunteer corps for the centers; it will train volunteers and develop an e-Mentoring program. The AGIF's Hispanic Center received funding from Citizens Bank to help refurbish the bank building donated for its center. The Disability Network is waiting to hear about a grant from the Mott Foundation to replicate its assistive technology program to other CTCs and to offer A+ certification. It is expected that the Regional Technology Center, with its substantial

budget, will undoubtedly contribute some in-kind support to the growth of its “feeder” CTCs, too.

## 7. Friendship Community Technology Resource Center

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**Friendship Edison Public Charter School, Inc., Washington, D.C.**

### Program Summary and Accomplishments

Friendship Community Technology Resource Center (FCTRC) is the only provider of public technology access in the economically distressed northeast quadrant of the District of Columbia. This CTC represents a collaboration among the Friendship House Association, the District of Columbia's oldest social service agency; the Edison Project, the nation's largest for-profit provider of charter schools; and the Friendship Edison Public Charter Schools, Inc. The Friendship House Association, which leads the collaboration, has identified technology proficiency as a key need in the community and included technology access and training among the core social services it provides. The CTC is part of Friendship House's approach to providing comprehensive, "wrap around" services for those in the community in need.

FCTRC supplements the technology programs available in the Edison Public Charter Schools, providing 19 networked computer stations and learning opportunities that respond to the interests and needs of students and members of the broader community. FCTRC programming provides young people with opportunities for project-based learning with technology, and helps give adults the opportunity to develop basic life skills, including technological skills, for operating in the local economy. The programming includes specialized programs such as robotics and broadcasting for middle and high school students as well as basic GED and adult education training. Although most of its programs currently serve youth, FCTRC places a priority on the goal of getting technology services to adults rather than youth. Program staff explain that children in the four affiliated charter schools have many other supports for learning technology.

For its many successes, CTCRC has also experienced difficulties attracting and retaining significant numbers of participants. Part of this problem likely stems from the CTC's newness; nearly all classes and programs we observed had recently been implemented. FCTRC's problems with recruitment and retention also stem from difficulties with encouraging parent involvement in its economically distressed neighborhoods and with

the transportation and safety issues associated with offering classes at night. Additionally, the pre- and post-tests required by a new accountability system only make the problem worse, since participants assume that the test results will affect their ability to remain in the program. Childcare has proven to be a significant obstacle, because, unlike some of the other CTCs in schools we visited, FCTRC has not been given permission to provide childcare on site. Center leadership is nonetheless committed to anticipating and removing barriers to participation for members of the community as much as possible.

## Basic Strategies

### *Approach*

The partnership that makes up FCTRC is the cornerstone of its approach to providing technology access to the neighborhood. FCTRC benefits from the strengths of its partners, which include a long-standing position in the community, deep understanding of its needs, and well-established technology presence in the schools. This CTC represents a collaboration among the Friendship House Association, the District of Columbia's oldest social service agency; the Edison Project, the nation's largest for-profit provider of charter schools; and the Friendship Edison Public Charter Schools, Inc, a joint effort between the two aforementioned organizations. The Friendship House Association takes the lead among the three collaborating organizations in championing FCTRC's vision and shaping its programs. Established in 1904 by volunteers concerned about the economic needs of the District's poor, the Friendship House Association now draws its leadership and most of its staff from the African American community it serves. In recent years, under the leadership of Donald Hense, the association has identified technology proficiency as a key need in the community and included technology access and training among the core social services it provides. The basis for this emphasis on technology is largely economic: technology proficiency is considered by program leaders to be a keystone in the array of competencies children and adults need for succeeding in the predominantly white-collar job market of our nation's capital. As a program administrator states, "With us [technology is] really not optional."

The Friendship House Association partnership with the Edison Project is a logical extension of the association's strategic "wrap-around" approach to providing social

services. This approach entails offering a broad range of complementary services that can help support a given individual to address multiple academic, social, health, and economic needs at the same time. For example, a parent seeking an after-school program for her child may also be assigned a case-worker to help her with housing, clothing, employment and adult education services. The partnership forming the Friendship Edison Public Charter Schools helps extend the wrap-around model to whole families by meeting a fuller set of children's needs and integrating these with other basic community services. Technology training is a central component of this comprehensive strategy for simultaneously providing core social services to both children and their parents.

Although most of its programs currently serve youth, as we describe in detail below, FCTRC places a priority on the goal of getting technology services to adults rather than youth. The reason for this priority, according to program staff, is that children in the four affiliated charter schools have many other supports for learning "technology as a second language" and are already "growing up with the keyboard." The FCTRC works to leverage its relationship with these schools by urging parents of children in all four schools to enroll in classes at the center. The CTC also leverages children's engagement with technology resources by encouraging those parents who have completed a required six-hour course on computer basics (a requirement for the children to be able to take laptop computers home) to continue developing their technology skills through FCTRC courses. In addition to working through the schools for outreach, the FCTRC works closely with case managers at Friendship House who refer participants to the center as part of its Temporary Assistance for Needy Families (welfare to work) or other employment services.

Another strength of the FCTRC's approach lies in its flexibility in adjusting programming to meet community needs. Troy Wolfe, director of technology and extended learning programs for the Friendship House Association, describes the organization as "grass roots." He adds, "How we use technology depends on the interests and abilities of the population we're serving." FCTRC works to be flexible both with regard to the programs it implements and the needs of individual participants. "We exist because of clients coming in, and we therefore have an obligation to make sure our programs don't become cookie-cutter," Wolfe explains. This commitment to tailoring programming to the meet the needs of individuals within the community results in a

strategy of rapid response; programs must be adjusted quickly when enrollments dip or other problems arise. More generally, FCTRC's flexibility helps the organization anticipate and reduce the barriers faced by people who could benefit from its programs but are prevented—for logistical, psychological, or socio-economic reasons—from full participation.

Important among its strengths, FCTRC's approach is rooted in its willingness to learn from its mistakes. Troy Wolfe and other key staff recognize how difficult it is to engage adults in the community it serves in learning technology skills—they are continuously searching for the right types of approaches to reach the variety of people who could benefit from the center's services. In its few months of offering programs, FCTRC has either modified or suspended certain offerings, depending on the interest and response of participants. Over time, with its dedication to reaching the underserved in the area, FCTRC expects to be able to find more successful formulas for attracting and retaining increasing numbers of participants.

### *Programming*

FCTRC distributes its programming between three computer labs, including a main lab housed in the Blow Pierce Campus of the Edison Friendship Junior Academy (a charter middle school) and smaller labs in the Langston Terrace Housing Project and in Friendship House itself. To meet the needs of different types of participants, the CTC provides a variety of programs across the three locations. These include:

- Educational enhancement and project-based learning programs during the day and after school for school aged children at Blow Pierce
- Adult basic education and family literacy programs in the evenings and Saturdays at Blow Pierce and Langston Terrace
- Technology and workforce training for adults at Blow Pierce and Langston Terrace
- A drop-in center at the Friendship House headquarters that enables participants to use available technology to complete projects on their own

During scheduled times in the school day, students at Blow Pierce use the FCTRC lab for academic enrichment activities and special projects. Special education students use the phonics awareness program Lexia in the lab at regular times during the week. FCTRC staff and school faculty have been working to develop a fine arts program at the lab.

Other programs, such as the Youth Entrepreneurial System (YES)—a program for familiarizing teenagers with the basics of operating a small business—have been tested at the lab but been discontinued. The DC Juniors, an after-school program for middle-school students sponsored by Friendship House, uses the FCTRC lab for its technology projects, including robotics and claymation (computer-based animation using animator's clay). The lab is also used after-school by Broadcasters, a class of twelve students that prepares the school's morning news videos.

The Blow Pierce and Langston Terrace labs offer technology-supported Adult Basic Education (ABE) and GED classes throughout the week and family literacy classes on Saturday. Students in one of the adult education courses have produced newsletter—"The GED Gazette"—using Microsoft Publisher. They write and edit articles, incorporating digital and conventional photographs in the layout and learning the necessary skills as they work. The ABE courses comprise work readiness instruction in addition to basic education and technology training.

The Blow Pierce site manager, Janice Peterson, teaches the adult "Introduction to Technology Course." The class meets once a week at the lab, during which time Peterson walks the students through particular features of applications, such as creating tabs in Microsoft Word. The FCTRC staff also teaches the "Home Rollout" course for parents of students in grades three and above who are participating in the charter schools' laptop program. Basic technology skills training is also incorporated into a combined GED/Computer Skills class taught at the Langston Terrace lab.

There has also been a workforce-related program offered at FCTRC. Additionally, a series of independent classes on business management has been planned for the Blow Pierce lab. Related to these efforts, Friendship House has set a goal of helping 25 individuals start small businesses. FCTRC is planning to offer technology certification programs for students who have completed basic computer literacy classes. Negotiations are currently underway with Cisco regarding a network certification program that will be offered either through FCTRC or Friendship Edison charter high school. Another program being discussed with the Correction Services Administration would aim to help former inmates re-enter the community through the development of technology skills for the purposes of employment.

The drop-in hours at the labs are designed to help reach FCTRC's goal of "having the resources and tools there when people need them," as Troy Wolfe explains. Adult participants use drop-in time to write resumes and conduct structured job searches; K-12 students work on projects with specialized software such as Microsoft Publisher; and staff take advantage of the available resources for developing their curricula and skills.

## Success of Implementation

Several staff members of FCTRC have extensive backgrounds in technology. Troy Wolfe, who oversees the day-to-day work of the CTC, holds a master's degree in educational technology, for example, as do other members of the teaching staff. Khalil Braswell, who is regional technology resources coordinator for Edison and directs the Broadcasters after-school program, left a position at NASA to be able to work with underserved youth. The dedication of these individuals and other staff underlie the center's adaptability and continuous efforts to refine its instructional focus and strategies.

Some of the current programming efforts have been more effective than others in developing strategies to achieve their vision. The Broadcasters class stands out because of the quality of the students' collaborative efforts, the teacher's responsive coaching, the focus on a well-defined product, and the meaningful learning experience it provides for participants. Students in the program take on authentic broadcasting roles (anchor, camera person, etc.), regularly critique recordings of previous broadcasts, and collectively revise their interview questions for mechanics, coherence, and interest. During our visit, our research team observed many instances in which students in the program supported one another to solve problems; one girl's frustration with writing high-quality interview questions was met with private offers of help from nearby students. Several students in the program stated that they wish to pursue professional careers related to their current experience. When Braswell contacted the mother of one of the show's anchors to tell her how well her son was doing, the mother asked that Braswell share his comments with a local minister who broadcasts on public access television. Conversations between the two program leaders have led to the planning of collaborative activities between them. Although Braswell comments that the creation of the CTC made Broadcasters possible, it

is evident that his vision, discipline, and humor have done a great deal to make the program a success.

The cooperation and quality of outcomes seen in Broadcasters characterizes the “GED Gazette” newsletter project as well. ABE/GED staff members are experimenting with other, hands-on, project-based programs, too, including PowerPoint presentations on topics relevant to the community and resume-writing programs for all participants, including ABE students. The adult entrepreneurial program, which supports the creation of small businesses in the community, met with some success during its initial run of a basic business management course, but a drop-off in attendance caused FCTRC to reorganize the program into a single-session workshop series. Staff continue to explore the best way to use center resources to encourage entrepreneurship.

The adult computer classes have also met with uneven success. A few instructors noted that their efforts to implement technology-based activities at times were impossible because they had more students than computers. Staff are still working on ways to form collaborative student groups in their classes and link learning to students’ immediate needs outside the classroom. It is possible that after programs become more well established, staff become more experienced, and community members particular needs become better known, instructional strategies in the adult computer classes as well as others will better support the vision underlying the programming.

## Challenges to Program Effectiveness

FCTRC has experienced difficulties with recruitment and retention. These problems may stem partly from its newness. Nearly all classes and programs were initiated within the few months prior to our visit, once set-up of the labs had been completed. Because of this, programming still is in flux. Wolfe and others in the staff expressed the hope that as programming is refined attendance will improve. FCTRC’s problems with recruitment and retention also stem from difficulties with encouraging parent involvement in its economically distressed neighborhoods and with the transportation and safety issues associated with offering classes at night. Despite its long-standing involvement in the community and the extensive local knowledge of its staff, the ABE/GED director for Friendship House, Jean Walker, reports that the organization itself still has problems

“keeping the numbers up.” The pre- and post-tests required by a new accountability system only make the problem worse, since it proves difficult, according to Walker, “to convince participants that their [test] results have nothing to do with them staying in the program.”

Logistical problems associated with start-up of the center have also affected enrollment. For example, during a delay in arrival of the Lego Dacta Robotics kits some students in the robotics program dropped out. Also, recruitment efforts for several programs began in September, at the beginning of the school year, but most of these programs were not fully ready to begin until January. As Walker describes it, “You have to engage the participants right away, [because] when [the programs] actually started, a lot had changed their minds, or gone in other directions.” Troy Wolfe colorfully gives a feel for the disappointment staff members feel when an event fails to attract participants:

You have the whole thing, “if you build it they will come.” Well sometimes they come, sometimes they don’t. It’s like “What do you mean? We built it. We did what you wanted. We had you in the process. We did a survey. We put up fliers. We called you. We had cookies. We had chicken, mashed potatoes!”

Wolfe explains the difficulties that arise with unpredictable levels of attendance:

We did an open house at Blow Pierce, trying to recruit specifically the population of parents whose children come to the school. And they looked at you and said, “I will BE there!” and you’re like, “YES! I got my folks! I got 36 people! We can double up on each machine.” And then the day of the class you get nine folks. And then the following week you get too many. Then it drops off. It’s frustrating. The money goes, for expenses and materials, whether 9 or 36 show up.

Center leadership finds itself in the position of working with extra diligence to try to anticipate and remove barriers to participation for members of the community in advance. Childcare has proven to be a particularly intractable barrier, because this difficulty is tied to the very location of the main FCTRC lab. Unlike some of the other CTCs in schools we visited, FCTRC has thus far been prevented from providing childcare on site, which center leaders feel has had a negative effect on attendance. The subsidized centers in the area are generally full, and only the Family Literacy classes at Langston Hughes offer simultaneous programs for children and adults. Still, Wolfe and Joe Harris, who manages

the CTC grant for Friendship House, are looking for creative ways to get around this problem.

FCTRC leadership has also been addressing transportation issues that might be reducing attendance at the Blow Pierce site. Although buses are available within walking distance, the school is not on a subway line, a preferred mode of transport for some people. Safety concerns about the area between the bus stop and the school also might make would-be attendees reluctant to come. The Blow Pierce campus is within a designated “safety zone,” patrolled by police officer, but participants still need to walk to the school from the bus. FCTRC has tried to encourage participants to come, nonetheless, by providing vouchers for public transportation and it has also used its own vehicles to shuttle participants from other locations.

Although recruitment and retention problems will not be solved immediately, FCTRC continues to monitor problems and make the adjustments necessary to improve its services. Through weekly meetings and extensive informal means, instructors and leadership discuss the problems participants are having and reasons they may be dropping classes. While thinking analytically about participants’ immediate circumstances, staff also think creatively about the possibilities for making the learning of technology skills more meaningful and compelling in people’s lives. Referring to the lab at Friendship House, Wolfe talks about the FCTRC’s commitment to flexibility in deciding how to use facilities and space: “I don’t know what this room will become—I do know that it will not be this a year from now.” Wolfe’s words also reflect an imaginative and hopeful approach to making FCTRC a hub of learning activity:

I want the CTC to have a presence. I’m not happy with the way the CTC looks. It’s not hip, it’s not fun, it’s not funky—I wouldn’t want to come here. Talk about people who had a bad experience with school! I want some flags outside, I want you to be able to see from the windows from the street to drive by and see C-T-C! and say, what IS that place? We’re going to get there...but I still have to change the environment. I want to put sofas in there and have it be like Starbucks—you come and your GED instructor and you put your feet on the table and its this reading group and you’re engaged in this meaningful activity and someone’s there taking notes of progress but you don’t even know, you’re kind of hanging out drinking tea, whatever.

Meanwhile, Wolfe and colleagues recognize the value of what they have accomplished. At the January 2002 meeting of CTC program grantees, Wolfe learned that while most CTCs are just beginning to try to find ways to provide wrap-around services, FCTRC's problems are different. Through Friendship House and its current partners, the center already offers a broad range of services. FCTRC's challenge, instead, is finding ways to integrate these services more tightly to make the most efficient use of funds and the most attractive offerings for participants. To meet this challenge, FCTRC continues to develop new partnerships and other means of encouraging greater and more sustained participation so that it can better address the technology needs of those in this inner-city community.

## 8. Family Technology Centers

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### **Blackfoot School District 55, Blackfoot, ID**

#### **Program Summary and Accomplishments**

Family Technology Centers, funded through Blackfoot School District 55's Community Technology Centers grant, provide enhanced technology access through local elementary schools to the Idaho communities of Blackfoot and Fort Hall. FTC project leaders have been working to develop programming that addresses the educational needs of these two distinct communities. Blackfoot is a small, predominantly white, Mormon community that is undergoing a demographic shift as Hispanic immigrants come to the area to work in the potato fields and processing plants that dominate the county's economy. Ten miles to the south, the Fort Hall Reservation has been home to the Native American Shoshone-Bannock people who have lived in the area for hundreds of years. Reading scores of many elementary students in both communities fall in the bottom quartile.

Each of the two Family Technology Centers provides 22 networked computer workstations for participant use. Center directors have stated that having the community technology centers at schools offers something for students and adults alike and makes it easy to provide technical assistance to keep centers up and running. The school-based approach has allowed the district to extend its reach into the community by providing educational services to adults. These services provide adults with opportunities to learn basic computer skills they can use to find jobs, to manage their finances, to communicate with others, and to explore their family histories. After-school programming has helped extend the school day for elementary-age students by providing them with opportunities to practice reading and mathematics skills using Lightspan's *Achieve Now* software. The centers have been particularly focused on leveraging knowledge of the institutions and cultural life of its Hispanic and Native American community members to bring in participants and sustain their participation over time.

To deliver these services, the FTC has hired qualified staff and volunteers who understand their communities well and can adapt program offerings in ways that reflect the distinct cultural practices of community members from white, Hispanic, and Native

American backgrounds. Through the VISTA-AmeriCorps program, the FTC has been able to hire one volunteer assistant at Fort Hall and two volunteer assistants at Stalker, each with cultural backgrounds similar to those of participants.

The end of the Department of Education funding as well as cuts in the state budget will likely mean that FTC's services will be severely curtailed in the near future. FTC directors have pointed out that although the state is mandating that schools maintain computer labs like those at Stalker and Fort Hall for on-line standardized testing, it is unlikely the district would be able to foot the bill for salaries of the center staff. Other problems for the centers are also significant. In Fort Hall, there is no transportation available to take children home after school. Additionally, in both Blackfoot and Fort Hall, it is difficult to attract teenagers to the Family Technology Center; other after-school activities compete for their attention and involvement.

## **Basic Strategies**

### ***Approach***

The Family Technology Center (FTC) at Stalker Elementary and Fort Hall Elementary are school-based community technology centers that aim to draw on the strengths and resources of schools to extend educational opportunities in the after-school hours to youth and adults in the community. Administrative leaders at Blackfoot District 55 believe that the public school buildings that house the labs are the best possible locations for the FTCs. According to Betsy Goeltz and Mark Kartchner, the project co-directors, having a community technology center at a school offers something for students and adults alike and makes it easy to provide technical assistance to keep centers up and running. For its elementary school students, the centers provide a convenient way to extend the school day's learning activities. For the working adults and seniors who attend classes at the center, the FTC provides them with a chance to see the schools as more a part of the community.

The fact that the FTC provides convenient and educational after-school care for youth is especially important in this school district. In both communities, there are few after-school alternatives for elementary-age students. Many students come from families where two parents work; they may go to day care after school or be picked up by a family

member who is on a constantly changing shift in a potato processing plant. Recently, youth activists in Blackfoot were successful in helping to build a skate park, but the park cannot be used during the snowy Idaho winters. Many students in Fort Hall stay outside, even in the winter, not engaged in any organized social activity. The after-school programs at both centers provide a safe, academically-focused alternative for youth in both communities.

Placing responsibility for maintaining the FTC on school personnel, moreover, enables rapid, on-site technology support. As the person in charge of technology for the district, FTC co-director Goeltz is uniquely positioned to keep a focus on supporting the FTCs and spending part of her time helping to keep them open. Center directors reported that the Internet connection was rarely down, and the principal has replaced computers that were broken at Stalker fairly quickly. Nearly all of the computers we observed at Stalker were functioning. When the lab was filled, only one or two spots in the after-school program at Stalker went unused because they didn't work.

FTC program developers have been challenged from the beginning to provide educational services that meet the needs of two quite distinct communities, Blackfoot and the Fort Hall Reservation. Blackfoot is a small, tightly-knit community with changing demographics. Historically, the largest religious group in the community has been the Church of Latter Day Saints (Mormons), and a Mormon commitment to the study of family history is evident from interviews with community members. More recently, there has been a wave of Hispanic immigrants, who have come to work in the potato fields and processing plants that dominate the county's economy. The Fort Hall Reservation ten miles south of Blackfoot has been home to the Shoshone-Bannock people, a Native American tribe that has lived in the area for hundreds of years. Fort Hall is faced less with the challenge of adapting to newcomers but more with the task of preserving cultural identity and autonomy in the midst of isolation and poverty.

Both Blackfoot and Fort Hall face a strong need to focus on teaching students to read and write. Reading scores of many students at both Stalker Elementary School in Blackfoot and Fort Hall Elementary School fall in the bottom quartile. Many students at Stalker do not speak English at home, and their parents' level of English literacy limits their ability to be involved in their students' learning. High levels of poverty among

students' families make it more challenging for teachers to help meet students' basic needs while holding high expectations for achievement.

In addition, in both communities there are adults in need of basic computer skills that could make them more employable in the region. Unemployment is increasing in the county, and is roughly 80% on the Fort Hall Reservation. According to staff at Idaho Job Service in Blackfoot, few adults seeking employment assistance have the computer proficiency that employers are seeking, even for entry-level clerical jobs.

The approach the FTC has taken has been to focus on addressing the needs that are common to both communities in ways that draw upon the culture and values that make Blackfoot and Fort Hall distinct. A core focus of both centers has been on improving reading achievement and on providing basic computer skills to adults. To deliver these services, the FTC has hired qualified staff and volunteers who understand their communities well and can adapt program offerings in ways that reflect the distinct cultural practices of community members from white, Hispanic, and Native American backgrounds. In Blackfoot, for example, adults enrolled in basic computer skills classes learn about word processing, spreadsheets, and the Internet in classes taught by instructors who provide instruction in English but who can provide assistance in Spanish to Hispanic participants who need help in their native language.

Both program staff and volunteers have been critical in making the programming culturally responsive. Brenda Honena, director of the Fort Hall Family Technology Center, is one of two certified teachers at the elementary school in Fort Hall that are tribal members. She comes from a family of educators: both her mother and sister teach at the tribally-run high school on the reservation. At the center, she treats the children much like an aunt might: she knows something of the life of each child, their parents, and how they get to and from the center each day. She knows brothers and sisters, and can guess where they might be reached if they don't show up to pick up a younger sibling. She helps with specific assignments, and monitors each student's computer use in the small room where the center is housed.

Through the VISTA-Americorps program, the FTC has been able to hire one volunteer assistant at Fort Hall and two volunteer assistants at Stalker, each with cultural backgrounds similar to those of participants. The Fort Hall volunteer, Shane Ridley-Stevens, is a Shoshone from Elko, Nevada. He is a cultural performer part-time, and

recently worked in a private religious school for native kids. When we observed him at Fort Hall, Shane seemed in his element, as skilled in assisting with the technology as in encouraging students to finish their homework. A large, blue-eyed man with two long braided ponytails, he is as at ease with the kids as they are with him. Laura and Mary Jaramillo are two local young adults who serve as the VISTA volunteers in Blackfoot. Both are from Hispanic families and attended high school in the area. Laura has considerably less experience in working with technology, but is particularly skilled in conducting outreach to the community. She is also a local, and her parents, too, were Hispanic migrants to Blackfoot some years ago from California.

## Programming

The FTC provides programs at two different centers to adults and youth in the after-school hours, Monday through Thursday. One center is located in the computer lab at Stalker Elementary School in Blackfoot, and another is located in a lab at Fort Hall Elementary School on the Fort Hall Reservation. The kinds of programs that are offered at the center include:

- After-school literacy and math practice using Lightspan's *Achieve Now* software
- Classes in basic computer literacy skills for adults
- Special projects and training sessions for people and organizations in the community
- Open access hours for participants to work on technology projects on their own.

When they come to the FTC, elementary-aged children are most likely to use Lightspan's *Achieve Now* software. *Achieve Now* is a popular educational interactive software package; it uses visually rich games to teach basic academic skills in reading/language arts and mathematics. It is designed to harness the motivation students have for attending to animations, cartoons, and multimedia products to improve learning outcomes. The games come on CD-ROM, are also available online for districts that purchase the program, and include an integrated assessment system. Both teachers and after-school staff can facilitate sessions where students use the software to supplement instruction. Classroom teachers are encouraged to sign up for slots during the school day to bring their classes in to use the Lightspan software. Districts can access professional

development materials online at the Lightspan site or have company staff provide them with training. Finally, there is a home component consisting of educational games which students can use at home with Sony PlayStations.

In addition to programs for youth, the FTC also offers several programs that teach basic computer literacy skills to adults in the evenings. A number of the participants in these programs are referred to the FTC by two local agencies that work with unemployed and underemployed adults.

## Success of Implementation

Implementation of after-school sessions differs somewhat between the sites. The space is somewhat smaller at Fort Hall, and because the community this FTC serves is much more geographically dispersed, fewer children typically attend each day. As a result, at Fort Hall, the after-school program director is often able to give each of the students one-on-one attention as they use Lightspan's Internet-based games. Many of the students do not use their headphones and work together on their activities. At Stalker, more children come in, and they line up to get their own CD and get to work on their own. The center is so popular that students are allowed to come to the after-school program just three of the four days a week the center is open, a situation described as "the fair way to do it" by one fifth grader, given the limited number of computers. The after-school directors are able to handle questions from students, but there are too many students for them to be able to monitor what each student is up to with the software.

Use of the programs during class time varies. While a number of teachers use the software during the day at Stalker Elementary, one teacher at Fort Hall estimated that just 3-4 teachers at her school used *Achieve Now* regularly with their students. Overall, probably fewer than half the teachers at Fort Hall have ever used the software with their students. Some of the variation may be due to teacher discomfort with the technology or lack of awareness of how to integrate the software with their teaching. Honena, the director, has had to institute a policy requiring teachers to go to the lab with their students, because at least one teacher was so uncomfortable with computers that she would simply drop her students off at the lab and leave. There has been some effort to get more

classroom teachers to use the software, making it more integrated in the home component.

Although the program has begun to collect data on children who regularly engage in using the Lightspan *Achieve Now* software, little is known to date about its effectiveness in improving literacy. Test scores at both Stalker and Fort Hall remain low; fears about the impact of the new accountability system in Idaho suggest that Fort Hall is particularly at risk. Still, several teachers we interviewed liked both the flexibility and the content of the software. Sandra Rainey, a first grade teacher at Fort Hall Elementary, noted, “The program gives me flexibility in the areas of classroom management and instruction, and helps to meet the individual academic needs of the students. Not only do the children enjoy the programs, but I do too!”

The home component of Lightspan *Achieve Now* is particularly advantageous because it does not require students to have a computer or Internet access at home. Families need only a television set and Sony PlayStations to play the Lightspan games at home. This turns out to benefit schools like the one we visited on the Fort Hall Reservation, where many Native American families lack computers and sometimes even telephone service. In these programs, the decision to make the technology “threshold” low for families is a conscious one in order to maximize opportunity for families that are least likely to have good technology access at home.

The adults who use the center at Stalker are among its most satisfied clients. Sonia Martinez of Job Service and Sheila Jackson of Vocational Rehabilitation, in particular have been successful in convincing their clients—who are looking to upgrade the skills they need to find jobs or seek new employment—to take advantage of the services provided. A large number of adult clients are seniors and retired people from the community who are seeking to learn about computers for the first time. Still others are adults who work in the community, but who are seeking to gain some new skill in using computers that will help them work more effectively and efficiently at what they do. Those interviewed comment on how helpful the instructors are and how much they value their patience and willingness to help them with problems that they encounter again and again. They also appear to be benefiting from the classes; the adults we interviewed gave us a tour of spreadsheet projects they had developed that were complex, involving the use of formulas, formatting, and charts that sophisticated users of spreadsheets might produce.

These adult classes have been particularly successful at the Stalker FTC in Blackfoot. The evening community programs that offer classes on various topics such as email, introduction to the Internet, Microsoft Office applications, and use of digital cameras are always full. In fact, many of the students repeat classes or take two and even three classes. Classes routinely fill up before they start, an indicator of both the demand and need for this type of programming in the community.

The Stalker FTC has been highly responsive in adjusting its course offerings for adults in response to community needs. For example, Sonia Martinez noticed that many small businesses were beginning to look for people who had skill in using Quickbooks, a bookkeeping program. The FTC bought the software for its computers in both Blackfoot and Fort Hall, and has already offered the course to 10 or so participants last fall. A class was scheduled for spring 2002 in Fort Hall.

The Fort Hall FTC has also been successful in developing special projects that serve their community and its organizations. This year, staffers undertook a project in which students from the junior/senior high school came to the center to upload Web pages and images for a Northwest Indian Youth Conference. The youth were charged with the Web site for this year's conference, and the organizers liked the work so much that they asked them to build the site again next year. The FTC staff also provided MS Office computer training for the Shoshone-Bannock Tribal Court staff members. Participants took classes in computer basics and the Internet, MS Word, Excel, and Access. Access was of particular importance to this group: the court administrator was developing a LAN, and wanted employees to be able to keep records in ACCESS on the network. A total of 26 staff members took 43 hours of training. Finally, the FTC at Fort Hall has provided MS Office training for participants in the Temporary Assistance to Needy Families (TANF) program, focused on computer basics, the Internet, Word, PowerPoint, and Excel. There were 29 participants in this program, who attended a total of 53 hours of training.

Many participants in both centers bring projects from home to develop on their own during open access times. During these times, usually once per week at each site, community members bring in their projects and get help with them from staff at the FTC. One woman has developed a sophisticated spreadsheet that allows her to track her family's truck-driving business expenses and income. The spreadsheet includes multiple sheets,

and she's learned (while at the center) how to create formulas and to format cells. When I commented that her sheet was quite complex, she said, "Really it's simple." But, she adds, she learned everything about Excel from being at the center, taking classes, coming in during open access hours, and working from home to create her sheet. In addition, during open access hours, one local graphic artist at Fort Hall has been coming in to scan in his drawings of Native American historical figures, edit them in PhotoShop, and upload them to a Web site he's developed to showcase his art. All of what he's done has been done at the center, he notes, and it has been a valuable resource to him in making his artwork available to others.

Perhaps the chief success of the FTC has been its skill in forming active partnerships with local agencies that provide referrals, input on programs, and some revenue to the centers. Many community organizations from different sectors are involved in the Family Technology Center, both advising project co-directors Betsy Goeltz and Mark Kartchner on programming and providing referrals and links to and from community services. Representatives from the school district's technology and vocational offices, employment and job training centers, local businesses, advocacy groups for migrant farm workers, and the Shoshone-Bannock tribal council all gave input to a needs assessment initiated by Goeltz to explore the need for a community technology center.

Together, these different stakeholder groups have helped to identify literacy, job training and placement, and basic technical training as the greatest needs in the community. Since the centers have begun operation, these stakeholders have remained involved in helping to set direction for programming, suggesting modifications to meet the needs of a particular segment of the community better or to reflect more accurately the technical skills required by employers. In return, they have referred clients to these classes and in some cases, provided funds to the FTC to make specialized training possible. The Shoshone-Bannock Tribal Court and TANF programs both provided some financial remuneration to the centers, though the FTC remained dependent on grant funds to meet its expenses.

## Challenges to Effectiveness

Perhaps the greatest fear of the center co-directors for next year, when their grant runs out, is how to provide funding for staff. Cuts in the state education budget have forced school districts to eliminate or reduce the size of programs; the timing could not be more unfortunate for the FTC. A meeting this spring confirmed that there was still no plan in place for paying personnel beyond the life of the grant. The district financial officer, Assistant Superintendent Scott Crane, reiterated a point we made the first year we visited the FTC: the district was committed to maintaining equipment and to keeping buildings open beyond the end of the school day. Goeltz and Kartchner pointed out that equipment would have to be maintained anyway: the state testing program was moving to online testing in 2003, which would thus require all schools to maintain labs for testing like those at Stalker and Fort Hall. At the same time, it was unlikely the district would be able to foot the bill for salaries of the center staff.

The VISTA-AmeriCorps program has stepped in to offer three volunteer positions for next year to the program. This offer is significant, since it would allow the FTC to keep the centers open beyond the life of the grant. At the same time, the plan is not without its limitations. Initially, the co-directors of the FTC made a decision to hire certified teachers to run the centers, to ensure high quality instruction. The new VISTA staffers do not hold teaching credentials, and one of the three has limited experience with using technology. This staffer's skill in translating instruction and reaching out to Hispanic participants at the center could only go so far in helping Spanish-speaking adults who came to classes at the center. When she first started, she said, she did not know most of the programs that were being taught. Moreover, she lacked the technical vocabulary in her native Spanish language to explain much of what was being taught. Fortunately for her, the family with which she was working at the time was understanding, and they kept coming despite her challenges in helping them to learn.

Last year, the FTC pursued a strategy of involving local employers more in the community technology centers, in an effort to ensure sustainability. They met with executives at local potato processing plants in the area. One suggested that the central need for his workers is in the specialized technology for assessing the quality of potatoes.

He stated a preference for holding mandatory training at the Family Technology Center for his employees, if the software were installed on the PCs at the Stalker center.

The FTC co-directors had gotten as far as getting commitments from executives at the company to work together to provide training to employees, but, according to Goeltz, the project seemed to fizzle. The companies are “internally focused,” she noted, with their own training programs and without much concrete need for services. By contrast, partnerships focused on individual clients with need has been much more successful for the center; therefore, Goeltz and co-director Mark Kartchner have directed their efforts on partnerships that target individual employees, or potential employees, rather than employers. Still, the funds provided by some of these agencies for special trainings have not provided enough income to sustain the staffing levels currently supported through the grant.

Ensuring that the centers are truly accessible to all members of their respective communities has been an ongoing challenge for the FTC. In Fort Hall, the center is not near the entrance to the school, which is surrounded by a fence. There is a side entrance, but the fence may be a reminder for some that Fort Hall Elementary School is one of the few properties on the reservation not under tribal governance. The school is run by the Blackfoot school district, and students and families must abide by public school rules and customs, rather than tribal traditions. In the past, this fact has been a source of friction between the district and the Sho-Ban tribe, because the tribe does not have autonomy within the school setting. Students must abide by school rules, which often conflict with native culture. For example, many students come to school late—“on Indian Time,” as both tribal members and Anglos put it. The school is required by law to send home tardy slips, and parents have little say over these laws or the consequences for their children.

Some tribal members look askance at the school, run by outsiders; likewise, teachers at the school say the district treats it much like a “distant stepchild,” providing it with little attention even if resources to help are pushed toward the school. The school is the only school for elementary-aged students, so Native American families do send their students there. And while the center at Fort Hall employs someone who comes from a family that is well-respected among the Sho-Ban, center activities for adults are less well-attended than those provided two years ago at the tribal junior-senior high school down the road run by the Bureau of Indian Affairs.

Other access barriers are also significant. In Fort Hall, there is no transportation available to take children home after school. They must walk home or be picked up by parents. In both Blackfoot and Fort Hall, it is difficult to attract teenagers to the Family Technology Center; other after-school activities like basketball, work, or just hanging out compete for their attention and involvement. Finally, the isolation of the Blackfoot and Fort Hall communities from one another—politically, socially, and economically—reduce the likelihood that young people and adults from one community will take advantage of services offered in the other community.

As the center moved into its last year of funding, nearly everyone we interviewed, including the program's director, spoke of the need for outreach to broaden the number of people who knew about the centers and their services. The top estimate of the percentage of people in the town who knew about the FTC at Stalker was around 20 percent. Some said outreach needs to be ongoing, so that people could find help at the right time, when they needed it. A staffer at Job Service suggested that the center ought to put an insert into the Chamber of Commerce's regular mailing.

The center co-directors believe that outreach and greater awareness of the FTC and its activities are key to sustaining the community technology centers in Blackfoot and Fort Hall. If more people knew about the FTC and used the services, they believe, there would be additional partners who might be able to pay a small fee for classes to be offered to their clients (free of charge) and thus help sustain the program beyond the life of the grant. The future is uncertain for the FTC, though if the past is any guide, its co-directors' resourcefulness and determination will help the centers transform themselves in a way that continues its mission of serving the people in this rural Idaho county.

## 9. Digital Family Project

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**Desert Sands Unified School District, Indio, CA**

### Program Summary and Accomplishments

As part of its technology master plan, the Desert Sands Unified School District (DSUSD) committed itself to increasing technological access and competence for the people of east Indio, the district's lowest-income community, composed of mostly migrant laborers and their families. Under the name The Digital Family Project (DFP), the district provides 287 networked computer workstations, academic support, basic technology training, and other services to children of all ages, teens, and adults. Among the resources the district draws upon for developing the program, four in particular have provided critical underpinnings for the project: the technological infrastructure of the school district; its extensive technology training for teachers; other complementary programs offered by the district; and the ability of the school to link families to DFP's technology services. A core element tying these strands together is the DFP staff, whose members reflect understanding of and connection to the community they serve.

Programs supported by the CTC grant achieve four related purposes. First, they provide basic access to technology for low-income students and their families through specialized programs and open-use hours. Over 2,000 community members used the facilities in 2001. Second, these programs provide academic support through skill-building programs in reading, writing, and math, and also provide resources for special projects and homework assistance. SAT-9 data for the schools served by the CTCs show significant increases in academic performance, with the greatest increases in the schools where the labs have been operating for the longest period of time. Also, the only schools to have met their Academic Performance Index target goals are the DFP schools. Third, these programs include well-attended adult education classes, providing participants with valuable economic and personal skills. One ESL/Computer Skills program in 2001-2002 was regularly drawing 60 to 80 participants twice weekly for an evening course. Fourth, the programs provided at the centers increasingly serve as a link between school and home for families who otherwise have little connection to their children's educational experiences.

Although many barriers still exist that prevent adults in the area from gaining technological skills, attendance at DFP adult programs increased over the period of a year during which we monitored the program, suggesting a trend towards greater utilization and more consistent outcomes. By far the biggest challenge facing the project now is funding. As the program approaches its third, and last, year, the district faces a significant budgetary shortfall. The program director unsuccessfully applied for another year of funding in a new grant cycle of the Department of Education's CTC program. Although the director will be reallocated to the classroom because of lack of funding, the district will maintain the DFP on a minimal budget. Which staff and services remain is yet to be determined. District staff suggest that instead of a three-year period of support, new programs should be supported for a full five years, allowing them to become well established.

## **Basic Strategies**

### ***Approach***

As part of its technology master plan, the Desert Sands Unified School District (DSUSD) has committed itself to increasing technological access and competence for children and their families in east Indio, the district's lowest-income community. Most of these children's parents are first-generation immigrants from Mexico, having come to work as seasonal farm laborers or maids, janitors, and cooks for the region's hospitality industry. The Digital Family Project, directed by J. Matt Blansett, has focused on two fundamental strategies for providing technology services to this community: (1) leveraging the community's existing resources and (2) working for program sustainability through judicious partnering and encouraging local control of each lab site. Among the many resources on which Blansett and his staff build, four in particular have provided critical underpinnings for the project: the technological infrastructure of the school district; its extensive technology training for teachers; other complementary programs offered by the district; and the ability of the school to link families to DFP's technology services. A core element tying these strands together is the DFP staff, whose members reflect understanding of and connection to the community they serve.

Working within the Technology Department of the unified school district has given DFP a strong position from which to accomplish its goals. Since 1996, due largely to the efforts of Dr. George Araya, director of educational technology and information systems, this 6-city, 24-building, 21,000-student district has had high-speed network connections to every one of its classrooms. This technological infrastructure supports the integration of computers into the regular instructional activities of the district's K-12 teachers, hundreds of whom have received extensive training (150 hours or more) in developing technology-based curricula through professional development programs funded by federal, state, and private sources. Outside of the regular classroom, students can participate in a variety of specialized technology programs, including an after-school academic support program originally funded through the 21<sup>st</sup> Century Community Learning Center grants.

DSUSD used 21<sup>st</sup> Century funds to establish during- and after-school academic support in reading, writing, and math at four elementary and junior high schools using NCS Learn's SuccessMaker software. These same four schools are also sites of four of the six community technology centers, allowing the district to expand services and cover the costs of hardware, software, staff time, and other essentials by sharing expenses between the two programs. Choosing SuccessMaker for the academic support program has meant that adults learning basic English in the evening use not only the same computers, but also the same software used by children during the day to improve language and math proficiency.

DFP staff has noted that the children most involved in the after-school programs have the parents who are most involved in the evening adult programming. These parents also are likely to recruit family and friends to participate as well. Most of these parents become familiar with center staff and their children's activities when they drop by the centers at pick-up time. Because their children like to spend time at the centers using computers, they are happy to go with their parents to evening classes at the schools. An intensive effort on the part of DFP to better serve adults in the community led to a massive outreach campaign at the beginning of the 2001-2002 school year and the development of evening programming that serves parents, their school-aged children, and the families' preschoolers at the same time.

Partnerships with a variety of community organizations have been helpful to the sustainability of the Digital Family Project, both in the short- and long-term. Satellite

access centers, complete with new computers, have been set up in three different federally supported housing projects (one labor camp and two apartment complexes) near one of the elementary schools. Originally envisioned as extensions of the after-school centers to allow for continued technological access in the evenings, the satellite centers have been able to maintain after-school programs during times when construction work has closed particular school sites. The satellite sites include up-to-date equipment and are open in the mornings as well as after-school and evenings. Although the district does not directly fund the satellite centers, it has provided equipment and software, and helped with staffing as needed, making for a total of nine DFP-affiliated labs sites. Once the CTC grant has ended, these satellite sites will continue to be supported by the housing entities. Among the other partnerships helpful to the community technology program are the Indio Public Library, which has received training and equipment from the district to increase the number of access points, and Sunline Transit system, which provides free bus passes for persons using the community technology centers.

Blansett and other program supports believe that the sustainability of the DFP past the final year of the grant depends on the conviction at the highest levels of administration for each school and the district as a whole that the project is working. For the most part, this conviction is there. Araya and his staff in the Technology Department have been careful from the beginning of their major technology initiatives to conduct formative and summative evaluations with the assistance of high-caliber outside consultants and to use these evaluations not only for their future planning but also to rally support throughout the district. Similarly, the Technology Department has been able to show significant test score increases (<http://www.dsusd.k12.ca.us/Schools/digitalfamily/>) and improved Academic Performance Index ratings (<http://star.cde.da.gov>) for the DFP schools. Above and beyond these outcomes, school principals and district superintendents alike have seen the overwhelmingly positive response to the community technology programs. As former Jackson Elementary School Principal Dr. Nancy Hill stated it, “We love our computer center. Every seat in it is taken up every day. Even if we had 100 computers, every chair would be full every day.”

In addition to engendering the enthusiasm of school and district administrators, the Technology Department has created a highly qualified core group of staff to oversee programming. Each DFP lab site also has well-trained and deeply committed certificated

teachers working with students and their parents after school and in the evenings five days a week. All the labs are staffed with teachers on Saturday mornings as well. The Digital Family Project has added an additional staffing element to its instructional approach in the form of community technicians, Familiar Faces From the Children's Neighborhoods, to assist at each site. Blansett describes the role of the Community Technicians:

These people are an important part of the program since they help develop a sense of ownership by the local community and serve as daily reminders that the community technology centers belong to the community. They make it feel like home.

Visitors to the centers can readily verify Blansett's evaluation. Taken together, the staff overseeing and implementing the Digital Family Project offer the best in instructional and coaching roles at each lab site, drawing together the other elements that make the project a success.

### ***Programming***

With a few exceptions, each of the six DFP sites offers similar programming, including daily open-access hours, one-on-one support from trained teachers and computer assistants, courses in basic skills (e.g., Introduction to Computers, E-mail, Internet Searches), and courses in basic applications (e.g., Microsoft Word and PowerPoint). Instruction and support for using NCS Learn's SuccessMaker software and taking on-line classes through NETg—a Web-based collection of training programs for different types of network technician certification—is available as well. Fully credentialed teachers provide assistance with homework and special projects, such as entries for the district-wide Technology Fair, at each of the sites. The six centers have between 25 and 75 workstations each; three of the centers have over 50. The three satellite centers, where many of the core DFP courses are also taught, have 15-20 computers each. At some of the schools the CTC workstations are distributed among more than one physical space, making for greater flexibility in programming.

A few specialized programs are provided at only one DFP site. These include MOUS (Microsoft Office User Specialist) training and an advanced program called "Technology Scholars" for third, fourth, and fifth graders who have shown particular interest in learning about computers. Blansett instituted this special tutorial program after noting how

frequently peers answered one another's questions, and, even more notably, how often children offered technological help to adults. Blansett and colleagues take the students through topics that, in many cases, the students choose themselves, including painting, drawing, and graphics; the Internet and telecommunications; and multimedia production, among others. The class is structured to be as "hands-on" as possible, and allows the participants ample time for discussion about everything from how to build screen savers to observations about the different kinds of ports the children have seen on computers. One of the primary aims of the Technology Scholars program is to create yet another human resource—in this case, informal student mentors—to support activities at the centers.

Starting in the 2001–2002 school year, a new ESL/Computer Skills course was offered at Jefferson Middle School through the DFP. Although DFP labs had been used for technology-supported ESL classes through a partnership with the district's adult education program since the beginning of the project, levels of participation in these courses varied. DFP decided to offer its own ESL course with a few distinct features. First, the course provides technology training in addition to ESL instruction. Blansett explained that many adults in the area with limited English proficiency are not motivated to take ESL courses since they are able to work and manage to "get by" at their skill level. However, the same individuals often feel that technology skills would improve their life situations, and therefore the opportunity to receive technology training serves as motivational impetus for them to join the ESL classes. Second, DFP provides simultaneous programs for school-aged and preschool children. The preschool program, in particular, makes participation possible for many parents who otherwise would be unable to attend. Third, and most importantly, according to the participants we interviewed, Ray Sala, a sixth-grade math teacher at the school and the main instructor for the adult course, is someone whose background, teaching strategies, and interpersonal skills make students in the class feel particularly welcome and understood.

In addition to the regular programming at the centers, each site also hosts open houses and celebrations throughout the year to familiarize the community with their services. Additionally, a district-wide Technology Fair, held in the spring each year, involves hundreds of entries, each judged by a panel of educational technology experts on clarity and completeness of presentation, connection to state and district standards, quality of explanation of the technology, creative use of technology, and thoroughness of discussion

of how the project was created. During our site visit, Anthony, a fourth-grader and member of Technology Scholars, explained that he was entering the fair for the third year in a row. Last year, he entered a Web page about international spies; this year, he is making a PowerPoint presentation about geckos. Like many of the entrants from the DFP schools in east Indio, Anthony has earned high scores at the fair. East Indio's entries in the district-wide Science Fair, often developed using resources at the DFP CTCs, fare similarly well.

## Success of Implementation

When asked about how he learned a number of features of the software he incorporates into his presentations, Anthony, who is a member of Technology Scholars and spends most afternoons in the Jackson Elementary School lab, explains that the school's master technology teacher and director of the after-school programs, "Ms. Kathy," a.k.a. Kathy Kronemeyer, helped him learn it. With regard to other features, Anthony says that his buddy Mark helped him. At yet other times, Anthony explains that he just "figured out" some particular feature on his own. Talking to Anthony's buddy Mark, who is creating a PowerPoint presentation about snakes for the Technology Fair, provides independent verification: teachers help students learn particular skills, fellow students help, and sometimes students wrestle with the problem on their own until they figure it out. The comments of Anthony, Mark, and other students we interviewed corroborated our own observations that outside of formal courses for adults, the "culture" of learning in the labs is characterized by a robust combination of teacher coaching, peer-to-peer instruction, and independent discovery.

These informal modes of technology learning seem to be influencing the community beyond the schools. At the Roosevelt Elementary School CTC, a fifth grader named Estelle, who had moved with her family to Indio from Mexico a few years earlier, showed us a PowerPoint presentation about dogs she was developing as a class project and was considering entering in the Technology Fair. As we discussed her design choices and Web search strategies, she told us that she would be including pictures she'd taken of her own dogs—Shadow and Whisper—in the presentation. When we asked her about the technical process of incorporating family photographs into her presentation, she said it

would be easy: she would use her dad's scanner at home and put the data on a disk to bring to the lab. Estelle explained that her father worked the fields picking crops like grapes, lettuce, peppers, and okra, but that he had bought a scanner and fax machine to send "recommendations" for his fellow workers. (These "recommendations" are likely verifications of agricultural sector employment, since some social services and benefits in the area, such as subsidized housing in the farm labor camp where Estelle lives, are restricted to agricultural workers.) Estelle told us that her 13-year-old sister is the one who taught her dad what he knows. This sister "fixes up" everything in the house—the VCR, the computer—having picked up her knowledge at school and through "hanging out" in the technology labs.

Lani Ray and Lisa Nelles, who both hold master's degrees in instructional technology and together oversee the Roosevelt lab, describe the increasing numbers of parents coming in to use the labs alongside their children. We observed a mother with her three daughters: a third grader, a fifth grader, who is in the special education class, and a sixth grader who has come to the site from the middle school. Another child, an eighth grader, comes in on Saturdays. Ray has noticed that several of the mothers employed as lunchtime yard supervisors come in on Saturdays. Parents come to these open access hours for basic computer tutorials, to do Web searches, and also to use the SuccessMaker software, which supports ESL development. Additionally, parents enjoy seeing the progress their children are making with in the SuccessMaker program.

Ray emphasizes how much the children like being able to observe their own systematic progress as it is tracked by the software. Mastering the Accelerated Reader feature of SuccessMaker is a "big deal" to the kids, according to Ray, and they come in regularly to try such feats as achieving four scores of 100% in a row. Children working with SuccessMaker often write journal entries such as this:

Today I did Reading Workshop. I am finished with Initial reading. I was so surprised when I got on Reading Workshop. It said I passed. I started to feel happy and I think my mom will be proud of me.

Ray, Nelles, and fellow instructor Daniel Martinez leverage students' enthusiasm for SuccessMaker by telling them that the SAT-9 is a lot like it. When they are taking standardized tests, they are told, they should pretend that their paper is the computer, and the pencil is their mouse—it is all the same basic idea. The children say thinking about

the test in this way makes them much less nervous. Providing participants with a high level of comfort characterizes the approach of all the DFP instructors we observed. Adult students in a class taught by Martinez at the farm labor camp satellite site lauded his patience and willingness to move as slowly through the material as they needed.

A few blocks away from Roosevelt at the Eisenhower/Wilson CTC, students are busily working away on SuccessMaker, on reports, and on other technology-based activities. Unlike the CTC at Roosevelt school, which has been newly remodeled, the room at Eisenhower is crowded and hot. But the children stay as long as the lab is open. A group of boys and girls are learning to map from SuccessMaker to another application on the district's server. One student is working with Fractal Design Painter 5.0. A few others, who have spent an hour or so using SuccessMaker today, are logged on to Funbrain.com, PBSKids.org, and other educational sites on the Web. One boy, a second-grader named Abraham, comes every afternoon to use 3D graphic design software. Today, Abraham is making intersecting shapes with Bryce 4, systematically testing different effects over the course of the afternoon.

Carlos Silva, the community technician at the center, helps Abraham every afternoon, recognizing the young child's special interests and skills, and doing what he can to support them, including supply Abraham with a variety of interesting design software for him to explore. Like several other instructors in DFP, Carlos' background is similar to that of the CTC participants. In addition to his role as community technician, Silva is also a student at the College of the Desert, where he is president of the MEChA chapter, continually working on projects such as food drives and programs to encourage local Chicano students to attend college. During an entire 3-hour afternoon session at the Eisenhower CTC, the children raise a continuous chorus of "Mr. Silva! Mr. Silva!" as they vie with one another to ask him questions or share with him their latest success. He breaks into a sweat running from child to child, giving them the attention they seek and also, undoubtedly, inspiring them to work hard at the center. In Blansett's estimation, Silva inspires more than this; he is a positive role model who demonstrates to the children that "one of their own" can achieve high goals.

Staffing the CTCs partly from within the local community is one of the many approaches that Blansett has thoughtfully planned. He has, for example, secured USDA funds to pay for snacks each afternoon for the children who come to the center. He also

encourages staff to arrange for the afternoon children to have outside time to play, and he helps staff arrange their schedules so that they will not “burn out.” Blansett, an experienced classroom teacher, has also proven to be a particularly capable and insightful leader. Largely because of his efforts, parents, teachers, community volunteers, junior staff members, and peers express feelings of pride in what children and families are accomplishing through the DFP technology centers.

## Challenges to Program Effectiveness

Between our site visits in 2001 and 2002, The Desert Sands Digital Family Project made significant progress towards providing more stable and well-received training in basic technology skills for adults new to the world of computing. Clearly, DFP’s services have become better established in the east Indio community at large. Although many barriers still exist that prevent adults in the area from gaining technological skills—e.g., many of these adults work more than one job, and have no time to attend classes—attendance at DFP adult programs increased over the period of a year, suggesting a trend towards greater utilization and more consistent outcomes.

Developing a large-scale adult program for the summer months, when much of the farming and hospitality work is suspended, would likely be the most promising strategy to engage more adults, but this program would need to be run out of the satellite sites, since district regulations regarding administrative oversight make use of school grounds almost impossible outside the normal school year. Interestingly, the attendance rate for the ESL/Computer Skills class remained high through the academic year until the second week of April. Instructor Ray Sala recognized that the switch to Daylight Savings Time had meant that work in the fields was continuing longer on a daily basis than before, making it more difficult for many of the regular families to attend.

By far the biggest challenge facing the project now is funding. As the program approaches its third, and last, year, the district faces a significant budgetary shortfall. Blansett unsuccessfully applied for another year of funding in a new grant cycle of the Department of Education’s CTC program. Blansett also requested a no-cost one-year extension of the original CTC grant to cover staff salaries with money available because of cost-cutting measures he instituted. As of the time of our visit, no response had been heard from ED, and Blansett will likely be reallocated to the classroom in the fall of 2002.

Although personally Blansett feels comfortable returning to the classroom, he regrets that the unique services provided by DFP will not receive adequate support in the foreseeable future. Blansett suggests that instead of a three-year period of support, new programs should be supported for a full five years—until they can become well established. A case in point is adult participation in the DFP centers; momentum is now just starting to build, and it will likely drop off with a decrease in programming and services. He contrasts this to the district's after-school technology programming for children, which effectively has had five years to develop (one year of preparation, a second year through 21<sup>st</sup> Century funding, a third and fourth year under both 21<sup>st</sup> Century and CTC funding, and a fifth year under CTC funding). The children's after-school programming is unarguably well-established and effective, as far as Blansett is concerned, and because of this he speculates that principals and other administrators in the district will find ways to keep people like Carlos Silva working in its computer labs.

The Digital Family Project's overarching goal of changing local culture around technology learning and use might still, however, have been met. The children of east Indio are competent technology users, and they are sometimes able, as in the case of Estelle and her sister, to help their families find and make use of the technological tools they need. Although without sufficient public access and, at least, minimal levels of instructional support this burden is too great even for the most technological proficient child, some impetus towards the goals of providing whole families with technological tools is gained through training the younger generation. Because of this, Blansett is emphatic about housing community technology centers in schools. He provided this opinion to district administrators in 2002:

Why school sites are the best sites for CTCs?

The local public schools are the best sites for CTCs because they are a preexisting center of the community. The schools belong to the families and they are comfortable accessing the facilities. Parents picking up their students at the sites can just stay and access the lab. Schools are a safe and friendly environment for our local community. Also these schools have the preexisting technological backbone that is necessary to set up and run Community Technology Centers on a continuing and reliable basis. The local public schools are the only facilities that are accessible to the entire community, and have existing school site councils

which insure continuing local control and involvement in decision making for the centers.

## 10. East Bay Neighborhood Links

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**YMCA of the East Bay, Oakland, CA**

### Program Summary and Accomplishments

East Bay Neighborhood Links (EBNL) is a partnership among several community technology centers and support organizations that serves some of the lowest-income areas of West Oakland and West Contra Costa County in the San Francisco Bay region. The collaborative includes five technology centers, which serve children in after-school programs (Coronado and M. Robinson Baker YMCAs), young adults in high-quality professional training programs (Street Tech and Urban Voice), and community members at-large through on-site open access and basic education programs (Crescent Park Multi-Cultural Family Resource Center; YMCA sites; Urban Voice). The YMCA of the East Bay serves as lead agency for the collaborative, which also includes several other community services, educational, and technical support organizations. Through its partnerships, EBNL works to increase community access to technology, to assist local schools and neighborhood organizations to use information technology for academic enhancement, and to prepare low-income community residents for placement in technology-related jobs. The CTCs in the collaborative provide access to 88 networked computer workstations for the people they serve.

EBNL's elementary after-school programs served more than 150 children on average per quarter during the first and second years of the program. During their second year of operation, these programs were supported by 2,880 volunteer hours logged by 64 UC Berkeley undergraduates. An independent evaluation of the program reported "positive reactions of parents and teachers to the gains in academic, computer, and personal skills that children have been making and the positive reactions of the children themselves" (Hippis, 2000). Numbers of elementary students served have increased since the second year of the program, new after-school programs have been added, and the quality of the programs has improved. Open-access programming served almost 1,400 participants in the second year of EBNL's operation under the CTC grant. The distinctive approach at two of the EBNL centers serves as a model for non-traditional workforce-development programming. In their second year, EBNL's workforce-development programs enrolled

111 students, graduated nearly 70% of these students, placed 80% of graduates in jobs, and retained approximately 90% of graduates to complete a period during which they mentored students in subsequent cohorts.

Although the end of the grant period likely means that the EBNL collaborative will take new form, its programs will likely continue. The lab director positions have been incorporated into the operating budgets for the two YMCA centers in the collaborative, and the EBNL director has arranged for Vista volunteers to help staff these centers as well as the center at a low-income housing facility. The workforce development programs will draw from their relationship with an new, multimillion-dollar entity they helped to form, and they will likely adjust their programming to serve, in part, as preparation for the training programs the regional center will provide. Additionally, these centers are exploring the possibilities of adding profit-generating consulting components to their services. Despite their funding successes, the work-force development CTCs will continuously be faced with difficulties in staffing such intensive and high-quality programs, especially as these programs grow and are replicated at other centers. Also, these programs will always be at least somewhat dependent on fluctuations in the economy, problems which were acute for the programs and their participants at the time of our visit. Still, program directors note that the ability to flexibly adjust one's own expectations and adapt to these changes as an essential element of the life skills training they provide.

## Basic Strategies

### *Approach*

East Bay Neighborhood Links is a partnership among several community technology centers and support organizations that serves some of the lowest-income areas of West Oakland and West Contra Costa County in the San Francisco Bay region. The collaborative includes five technology centers, which serve children in after-school programs (Coronado and M. Robinson Baker YMCAs), young adults in high-quality professional training programs (Street Tech and Urban Voice), and community members at-large through on-site open access and basic education programs (Crescent Park Multi-Cultural Family Resource Center; YMCA sites; Urban Voice). The YMCA of the East

Bay serves as lead agency for the collaborative, which also includes UC Links, a network of university/school/community partnerships providing guided technology-based activities in after-school settings, and WestEd, an outside evaluator focused on strengthening programs to better meet their objectives. PowerUP has provided the computers to launch one of the EBNL centers. Other organizations—such as CompuTrain and LEAP, a local literacy program—have partnered with individual EBNL centers to improve programming. Through its partnerships, EBNL works to increase community access to technology, to assist local schools and neighborhood organizations to use information technology for academic enhancement, and to prepare low-income community residents for placement in technology-related jobs.

For all the EBNL technology centers, EBNL has provided a necessary infrastructure of support. Funding from the Department of Education's Community Technology Centers program allowed Street Tech to launch its center, Urban Voice to begin job training, the after-school programs to acquire equipment and hire staff, and four of the five EBNL sites to begin access-focused programming. The collaborative employs a full-time director, Christine Karim, who coordinates funding, evaluation, reporting, development, and other efforts across all five centers, allowing directors and staff at the individual CTCs to spend more time on planning and programming.

During the three years of the CTC grant, the elementary-student after-school program at the two YMCA-housed centers has expanded from its successful but limited programming based on the 5<sup>th</sup> Dimension after-school club model, developed in the late 1980s at UC San Diego by Michael Cole and his colleagues (Nicolopoulou & Cole, 1993). This model uses discrete educational software (mostly CD-ROMs like those in the Math Blaster and Reader Rabbit series) as the basis for learning activities that are supported through student interactions with peers, center staff, community volunteers, and undergraduate volunteers provided through the partnership with UC Links. In addition to its 5<sup>th</sup> Dimension program, after its second year the YMCA centers began to offer other after-school, evening, and weekend programming for a wider variety of participants. This shift in approach allowed the center to serve not only the local elementary children, but the families of these children as well. The YMCA centers have additionally shifted away from staffing the centers with UC Berkeley undergraduates—who typically only remain in

the position for one year or less—to hiring permanent employees—mostly, recent college graduates—who speak Spanish.

The Multicultural Family Resource Center, directed by Leonard McNeil, serves residents at the Crescent Park housing complex and community members from the surrounding area. Originally established on a small scale before receiving CTC funding in FY99, the center has moved from its first location to a new, larger, multipurpose space that includes state-of-the-art technology. In addition to basic computer technology and instruction, the center provides residents with copy and fax machines, and even a coin-operated laundromat so that, according to McNeil, “you can run your laundry and come in and check your email.” Because Crescent Park is part of the EAH non-profit housing corporation (formerly the Ecumenical Association for Housing), it qualifies as a Neighborhood Network site, and therefore the CTC receives HUD funding. In addition, PowerUp! has donated 20 Gateway computers to the Crescent Park Center. EAH has a full-time IT professional that services all the sites, including Crescent Park, and the full-time instructor there is also capable of maintaining the new technology at the site. The Crescent Park facility directly supports staffing at the CTC by funding both a full-time computer instructor and a family services coordinator to assist with complementary social services.

The workforce development programs offered by StreetTech in the city of San Pablo and UrbanVOICE in Oakland have refined their highly successful programming and expanded from two individual centers by becoming members of a collaborative of related training centers during the second and third years of the grant. Despite the downturn in the information technology sector after their first year of operation, the centers have managed to place most of their graduates in technology-related jobs. StreetTech reports, for example, that 100% of its third class of graduates are working in paying jobs, with 70% of those working in the technology field. UrbanVOICE has had similar successes. Both centers’ goals are to help their participants develop deeper commitments to leadership, social responsibility, and community participation. As Paul Lamb, executive director of StreetTech states, “On a good day, we’re not a tech training organization—we are a community development organization.” Lamb feels that this program emphasis is consistent with other aspects of StreetTech’s “soft skills” training, such as how to successfully get and keep a job. As Lamb summarizes his workforce development

approach, “The focus is more on practical and realistic tools that people can actually use once they’re in the workplace.”

Boku Kodama, Lamb’s counterpart at UrbanVOICE, shares a philosophy of integrating technology training with community-building and cultivating in his students a disposition toward life-long learning. Kodama also has succeeded in expanding his model; in addition to serving as executive director of UrbanVOICE, Kodama has become CEO of Bay Tech, a workforce-development collaborative that currently encompasses centers across the Oakland and Contra Costa County region. Through an initial grant of \$300,000 from the James Irvine Foundation, Kodama has established five new centers under Bay Tech’s umbrella. Working with the City of Richmond as the fiscal agent, Kodama has recently secured a \$3,000,000 grant from the Department of Labor’s H1B program to create additional facilities and expand Bay Tech’s services. Bay Tech has established a partnership with the Community College District of Contra Costa County to provide several additional services that meet the wide range of technology, life skills, and basic education needs of the community. The college district provides instructors and receives California state funding for each student attending classes. One of the new sites, the Cypress Mandela Bay Tech center, operates in a large warehouse where many technology training and social service programs run simultaneously. UrbanVOICE has shifted its program objectives to more basic educational services that can provide the underlying foundation for additional technology training. Like StreetTech and UrbanVOICE, the Bay Tech collaborative relies heavily on benchmark measures to assess its students’ achievement both in technical expertise and in life skill accomplishments.

### *Programming*

As mentioned, the Coronado and M. Robinson Baker YMCAs offer several types of programs in addition to the 5<sup>th</sup> Dimension approach for elementary students after school. The full range of programming includes:

- The 5<sup>th</sup> Dimension academic enrichment program
- NutraLinks, an after-school nutrition and safety program in which young people create an interactive nutrition education game mentored by UC Berkeley undergraduates
- An open-access and project-oriented after-school program for teens

- A program introducing seniors to technology, coordinated with a senior swim and exercise initiative
- Evening open-access hours for adults
- Weekend family programming, addressing the needs of multiple age-groups simultaneously
- Special events such as La Familia Technology Day held at the Coronado center

Christine Karim, program director for the EBNL collaborative, has worked closely with these two centers to create these new programs and to also find ways to develop activities and initiatives to support early childhood education.

The Crescent Park center offers basic technology and specialized programs for its residents and members of the greater community. These programs include:

- Extensive open-access hours
- Introductory computing and application courses
- Internet and Web courses
- Digital storytelling classes offered through a partnership Park with Third World Majority, a group that grew out of UC Berkeley's Center for Digital Storytelling.
- "Neighborhood college," in which students use the CTC for video conferencing into local community college courses

The Crescent Park center's HUD support and rich base of partnerships has added to the strength and flexibility of its programming.

The workforce development programs, StreetTech and UrbanVOICE, have each crafted model programs for helping community members develop the skills needed to find and maintain jobs. Both StreetTech and Urban VOICE offer:

- Semester-long, intensive technology training leading to network administration certification, such as A+
- Training in a wide arrange of life skills, including job-hunting techniques, and the skills, habits and attitudes that are necessary for professional success

StreetTech additionally builds into its program a formal "give back" component, where participants, even after they have graduated, remain obligated to contributing to StreetTech and other social service efforts in their community. OpenVOICE has a wide range of life skills activities, including cooking classes and art appreciation events, and is transforming itself into a "foundations" program, where students with no previous experience can learn how to type, use the most basic computer applications, and think

more critically about life management and skills. It has added more open-access hours and a digital storytelling class, which is particularly well-attended. UrbanVOICE also offers a financial literacy class, a course in entrepreneurship based on case studies of successful business initiatives (including those undertaken by center director Kodama). Kodama's next initiative for the center will be the OpenVOICE Academy, a live-in program where participants would spend 8-10 weeks in a dorm where they would live, breathe, and learn "a new way of being in the world"—that is, self-directed and responsible for their own well-being and that of their community.

## Success of Implementation

StreetTech and OpenVOICE provide particularly interesting models of the types of commitments and approaches that can make workforce-development programs successful. Lamb and Kodama—who both have first-hand experience of inner-city violence and crime—see their objective as effecting fundamental change in people's lives, so every aspect of their programming is designed to contribute to this aim. Although the concept of their programming is simple—to direct network training at the "non-traditional work force"—in practice, of course, the approach requires a great deal more. Still, the results are impressive: on average, 70% of participants complete the course, and, depending on the session and fluctuations in the economy, between 65% and 100% of these students have been placed in jobs.

Part of the strength of the approach lies in its rigor. Each of the young adults interested in taking classes at these centers goes through an intensive screening process that can include interviews, written essays, and pencil-and-paper testing. Students are expected to be at class, on time, for four or five sessions each week, typically totaling 20 hours per week for a full six months. During the first orientation meeting for the second cohort of Street Tech participants, two young people who had previously been accepted into the program were turned away and told to resubmit their applications later because they were 7 minutes late to a 3-hour class. Street Tech has a dress code requirement (business casual), which was instituted to habituate students to presenting themselves appropriately in professional settings. Students coming to class in jeans or mini-skirts are not allowed to attend that session. Although staff at UrbanVOICE tend to be more

flexible, both centers operate on the principle that the only way to transform its students is to instill new sets of values in them.

Another core element of the approach taken by these centers is the essential focus on life management and skills. The curriculum for these courses include material from “7 Habits of Highly Effective People,” “How to Think Like Leonardo Da Vinci,” and “Thirty Ways to Shine,” a standardized program that trains adults in how to behave on the job. Lamb and Kodama have decided in the past year to strengthen what they call the “foundations” program, and bring participants with low-level academic or life skills up to a place where they can effectively participate in the technology and workforce training programs without the extreme difficulties they would otherwise have.

Perhaps the most fundamental and distinctive feature of Street Tech and Urban Voice is the responsibility students take for one another’s successes and failures. At Street Tech, the essential maxim is “The more you know, the more you owe.” At Urban Voice, signs around the computer room list variants of its essential maxim: “Each one teach one.” Lamb, Kodama, and the other staff at each center exemplify this ideal in a number of ways, each showing that acquiring new knowledge can and should be about service to others. Peer-to-peer learning, collaboration, and a spirit of cooperation with fellow students are new experiences for many of the participants. Asked what makes centers like Urban Voice and Street Tech different from school, the most frequent response from participants was, “the teamwork.” Van Souk Lianemany, a former gang member who, thanks to Lamb’s support, turned his life around and became an early advisor to Street Tech, pointed out the broader sociocultural aspect of this teamwork:

The great thing is that [at these centers] you see a lot of cultures combined helping each other out. You got the blacks, Asians, Mexicans studying with each other, working with each other. You barely see that, you know. Each race usually sticks with its own....Where I grew up, it was all about dedication to friends, dedication to friends and to themselves. That’s how all these little gangs got started, through dedication to friends and themselves. If we could establish that they dedicated themselves to something useful, something good, then later on, after they get their first job and learn, they’ll come back and say, “I didn’t get all this for free; somebody gave me a helping hand, so now it’s time for me to give back.”

Giving back is institutionalized at Street Tech and Urban Voice. On the first day of the six-month program, students are asked to discuss the meaning of community, then ask themselves, “How am I going to give back?” After this, they are required to develop and execute a plan for initiating community support and development. Within just a few months of completing the program, graduates are expected to contribute a specified number of hours of service for each hour they spend in training themselves, helping the center and subsequent generations of students.

This “give back” system is about more than reciprocity, or even sustainability for each of the centers. Giving back is about transformation of one’s identity. The programs at Street Tech and Urban Voice work powerfully to achieve such transformations, which are multifold. First, students are transformed from technology “outsiders” to technology “insiders.” Again and again, participants said that new opportunities and greater earning potential were important to them, but even more important were issues of “not being left out” of the digital revolution, indicating their resistance to being marginalized along yet another dimension in American society. Second, students are transformed from digital and economic “have-nots” to “haves.” As more and more graduates get well-paying jobs, they experience new roles based on their economic status. Third, and perhaps most importantly, students are transformed from being recipients to being “givers.”

## Challenges to Effectiveness

It seems likely that at the end of the CTC grant, EBNL itself will take a new form, perhaps splitting into different entities representing the programmatic affiliations between the centers. Thanks to the efforts of the collaborative’s coordinator Karim, the lab director positions have been incorporated into the operating budgets for the two YMCA centers. She has also secured the participation of Vista volunteers to help staff these centers—a model that Crescent Park might be able to adopt as well. The YMCA centers will be supported by their parent organization, and the Crescent Park center will benefit from its affiliation with the Neighborhood Networks program. While StreetTech and UrbanVOICE will draw from their relationship with Bay Tech, both programs continue to strive to achieve self-sustainability, perhaps by adding a profit-generating consulting component to their services. Workforce-development programs will always be at least

somewhat dependent on fluctuations in the economy, and Lamb and Kodama see the ability to flexibly adjust one's own expectations and adapt to these changes, as an essential element of the life skills training they provide.

In addition to funding and sustainability, EBNL has faced other challenges. In its second year of operation, EBNL did not meet its goal of providing computer access to 3,000 community members. Part of the difficulty arose from a delay in opening the newly refurbished Crescent Park center. However, adding workstations at UrbanVOICE and open-access hours to the YMCA programs will likely contribute greatly to the number of individuals that are able to freely make use of the technology. Distributing open-access programming among several centers is particularly important given that each of these centers serves different communities separated by substantial distances.

Changes in the economy also pose a challenge. Street Tech and UrbanVOICE have needed to adjust their models—and their participants' expectations—for job placements based the state of the economy, particularly in the information technology sector. Finding suitably qualified instructors with adequate time to develop or adapt curriculum materials for the technology training component of their programs has also proven difficult for Street Tech and UrbanVOICE. Instructors who are technologically well trained enough to teach the courses are also well trained enough to earn a substantial income elsewhere, though less so in an economic downturn. Even when available, few technologically knowledgeable instructors have enough pedagogical skills and understanding to teach well. Even fewer have experience working with young adults who have been living in underserved communities. Those with the qualifications to take on the task can easily be overwhelmed by the demands. Although, Lamb and Kodama have often been able to attract the type of instructors they need, they will continuously be faced with difficulties in staffing such intensive and high-quality programs, especially as these programs grow and are replicated at other centers.

Paul Lamb described the essential challenges facing any new workforce- development program built on the StreetTech model:

The kind of core things, the deal-breakers for me would be first, the vision—do you share the vision of teaching, learning, growing as part of a community, and giving back?

The second thing is professionalism, and maintaining a very disciplined rigorous course, and not, kind of, pulling back from that because so-and-so has this particular problem. I mean, there is room to negotiate those individual crises and situations built into the program, but...if they miss more than two classes unexcused, they're out of the program. Those kind of fundamental things make up number two.

And number three, which is really what makes any good teaching organization work, is finding teachers that can teach. Whether it be the tech skills or life skills... [the students] have very little if any experience with all this stuff and [the teachers need to] really relate to them, really be able to work with them, grow with them, get them excited about this stuff. But also at the end of the day, [the teachers] are not just going to walk out of the classroom, get in a car and drive home and not even think about what they just did for the last hour or four hours or however long they were there. They're going to take a call from a student who has a concern about this particular issue, they're going to set up an appointment with someone on the side and work with them on this particular thing. They are just 100% committed to this whole idea.

Lamb and Kodama know that high levels of commitment are necessary to sustain programs like Street Tech, UrbanVOICE, and, now Bay Tech. Maintaining this commitment will perhaps always be the biggest challenge for programs of this type and caliber.

# 11. Mercy NET Centers

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## Mercy Housing California, San Francisco, CA

### Program Summary and Accomplishments

Mercy Housing California (formerly Mercy Charities Housing California) is a faith-based, non-profit organization that operates facilities containing several thousand housing units across the state. Technology access and training are part of the core services Mercy Housing strives to provide to its residents. Of the 20 technology centers at Mercy properties throughout the state, seven are funded by the U.S. Department of Education's CTC program (the "NET Centers"—Neighbors, Education and Technology). The seven NET centers serve 581 family apartments across seven neighborhoods in four California cities: San Francisco, San Leandro, San Jose, and Bakersfield.

Mercy NET centers provides computer access, technology training, and educational support to its low-income residents of all ages who typically have few, if any, other opportunities to learn technology skills in the community around them. Young children develop basic familiarity with technology, youth develop more specialized capabilities, and adults learn technological capabilities that positively affect their employment prospects, their ability to communicate, and their sense of self-worth. The seven CTCs supported by the Department of Education grant bring educational and technology support almost to residents' front doors, and integrate technology skill development with the many other key social services the organization provides.

In addition to receiving technical support from several well-established organizations, such as CompuMentor, in the San Francisco Bay Area, the Mercy NET centers leverage resources across sites to most efficiently and effectively provide services. NET centers use a centralized staffing model consisting of a four-person team that provides management, outreach, curriculum, technology, education, and program implementation support across centers. The centralized team is able to develop and leverage resources in ways individual center directors often can not, largely because of limitations on their time and expertise. The team works directly with each of the seven CTC sites, supplementing the capabilities of the one- to three-person paid staff and volunteers at each center.

The Mercy NET program faces challenges both in sufficiently training all of their staff and in tailoring their centrally developed materials to the specific characteristics of their many centers. The diverse residents at each of the centers—different ages, languages, home countries, economic statuses, and specialized needs—require center staff to be highly responsive and creative in offering programming that can meet the variety of needs. Overall, staff at each of the centers are working to find the balance between prepackaged programming, meeting the needs of the local population, and attracting new groups of residents at the property that could benefit from center offerings. For staff to be able to accomplish better these complementary but challenging goals, they need sufficient professional development opportunities as well as continuing support from Mercy Housing’s central staff.

## Basic Strategies

### *Approach*

Mercy Housing California (formerly Mercy Charities Housing California) is a faith-based, non-profit organization that operates facilities containing close to 5,000 quality, affordable housing units and is developing 3,000 more in the state. It serves low-income families, seniors, formerly homeless persons, individuals with HIV/AIDS, and persons who are chronically mentally ill. Increasingly, technology access and training is becoming more important to the core services Mercy Housing provides to its residents. At present, there are 20 technology centers at Mercy properties throughout the state, seven of which are funded by the U.S. Department of Education’s CTC program. Mercy has named these seven CTCs “NET Centers” (Neighbors, Education and Technology). The seven NET centers serve 581 family apartments across seven neighborhoods in four California cities: San Francisco, San Leandro, San Jose, and Bakersfield. The mission statement of the NET centers reflects the significant outcomes intended for them: “to empower our residents and their communities by providing opportunities for lifelong learning, personal development, social change, and economic, educational, and career advancement through greater access to computer technology.”

Like other centers within collaboratives or alliances, the Mercy NET centers leverage resources across sites. Mercy NET centers use a centralized staffing model consisting of a

four-person team that provides management, outreach, curriculum, technology, education, and program implementation support across centers. The team even includes an “Arts Integration Coordinator,” Gwen Yaeger, whose job is to help develop curriculum that encourages participants to use technology to create expressive and meaningful content—a powerful format for learning technology skills. The centralized team is able to develop and leverage resources in ways individual center directors often can not, largely because of limitations on their time and expertise. The team works directly with each of the seven CTC sites, supplementing the capabilities of the one- to three-person paid staff and volunteers at each center. Not only does the team offer materials, information, and tools for the centers, it also steps in to troubleshoot when a center has a particular problem.

Mercy has forged strategic alliances to support the operations of its centers. Salesforce.com has been an essential partner to Mercy, providing software training for CTC staff, curriculum for youth programming, and other forms of ongoing support. The initiative and commitment demonstrated by program manager Sister Patsy Harney and her team motivated Salesforce staff to find a way to work more closely with Mercy. In an interview, the Salesforce consultant to Mercy, Steve Wright, explained, “Mercy folks always show up [to trainings], and their energy is inspiring.” Mercy NET Centers in California have also developed a local partnership with One Economy, a project initiated by the Enterprise Foundation with the goal of catalyzing the use of technology in low-income areas by working with affordable-housing developers to modernize their operations. Building on Mercy’s existing relationship with One Economy, the Mercy NET Centers secured access to two Cisco fellows, technology professionals on paid sabbatical from Cisco to provide industry expertise to community initiatives. Other partnerships have helped support individual centers. One of the Mercy NET centers, for example, is run by the Boys & Girls Club in partnership with several other organizations, including PowerUp!, which provided hardware for the center.

To address ongoing troubleshooting and technical maintenance issues, Mercy bought a block of technical support time from Up Time Resources, a systems administration service. They also have received support from CompuMentor, a San Francisco-based technical assistance provider for non-profits. CompuMentor recruited and trained a technical support person for Mercy through an apprenticeship program that now provides

Mercy with six hours per week of assistance in maintaining the technology infrastructure for its NET Centers. The seven centers include a total of 61 workstations, ranging from 3 to 11 at any one center. All seven sites have color printers and digital cameras; six sites have scanners, five have laser printers, three have LCD projectors, and two have video cameras. Software used by the NET centers includes office applications (Microsoft Office Suite), Web design (Macromedia Dreamweaver 4), video and graphics (iMovie, Adobe Photoshop 6), and educational titles (The Magic School Bus Series). Though computers are networked at these centers, only one site is running a server.

Each of the Mercy Charities properties not only has a lab coordinator for its CTC, but also a Community Resident Initiative Coordinator (CRI), who helps residents obtain the human services they need. CRIs enjoy close relationships with the target population of the CTC, which contrasts stand-alone CTCs where staff might be uncertain about many of the demographic, familial, and educational backgrounds of their participants. CRIs conduct surveys to determine residents' interests, including CTC programming; they also provide outreach—through fliers, parties, word of mouth, and other means—to inform residents of services and new initiatives. Together, the lab coordinators and CRIs integrate technology training into the broad and complementary range of social services Mercy Housing residents are able to access.

Mercy Housing CTCs have a “captive audience”: the families who live in the property. Mercy's model of incorporating CTCs into supportive housing gives participants technology access where they live and also provides them with the scaffolding and guided practice necessary for learning to use technology. CRIs at two of the Mercy sites are developing plans to provide residents with computers and Internet access within their homes, plans which depend on maintaining community technology centers within the properties so residents can receive the training they need.

### ***Programming***

Although the seven Mercy Charities NET Centers benefit from the same curriculum and programming support from the central staff, each center has its own distinctive features. Brief descriptions of the six (out of seven) centers visited by our research team follows.

- **SoMa, San Francisco**—The SoMa Net center, in the South of Market Neighborhood of San Francisco, provides computer access and project-based programming to children, youth, and adults. The environment helps participants initiate projects of meaning to them, and provides the human support critical for becoming technologically fluent in using a variety of specialized and general-purpose applications.
- **Eden House, San Leandro**—Situated in an unincorporated area adjacent to the municipality of San Leandro, the center provides access and training to residents who otherwise do not even have a library or after-school programs available to them. The lab coordinator, Cinda Bailey, who had been working in Silicon Valley's technology industry, took the job with Mercy after being amazed by the enthusiasm and level of activity at the center. Under her guidance, children and youth engage in complex and challenging projects, making PowerPoint presentations and videos about issues of concern to them. In addition to skilled staff, the center is supported by dedicated and capable volunteers, who help teach basic computer and Internet classes and even help develop curriculum.
- **Plaza Maria, San Jose**—This center, located in the city's downtown area, provides a resource center for middle- and high-school-aged girls who live at the property. They meet at the center almost daily, where they engage in a variety of projects—both high- and low-tech, initiated by staff or by the girls themselves. After completing their homework, the girls do Internet searches, play games, and often chat with each other on line, even while sitting within a few feet of one another. Most of the adult participants in the center's computer basics and Internet classes are elderly Vietnamese. Programming at the center is implemented by the CRI, Queenie Ngo, who has a degree in speech therapy and extensive work experience in the technology industry in Silicon Valley. A 16-year-old girl who lives in the complex helps with programming for young children.
- **Heritage Homes, San Francisco**—This NET center, in the Visitacion Valley neighborhood, is in its start-up phase. It is one of the sites for which plans are being made to implement broadband services in residents' homes. Our research team observed a meeting among representatives from Mercy Housing, Salesforce.com, Cisco, and One Economy. The CRI from Heritage Homes, who lives in one of the units, presented plans to train technically proficient volunteers from within the program to act as a full technical support team for the computers and services.
- **Padres Palou, San Francisco**—Located in the city's Mission District, this small center focuses on reading and academic skills. Rosa Pasqual, who holds a degree in psychology and volunteers her time at the center two days per week, has created a small program of her own in which children practice taking multiple-choice reading comprehension tests based on passages Pasqual has selected for differing age groups.
- **111 Jones, San Francisco**—Situated in the Tenderloin neighborhood of the city, the center is a collaborative effort of four agencies: Mercy Housing, the local Boys & Girls Club, the Turk Street Management Company, and the Chinese

Community Development Corporation. The CRI at the center has a background in sociology, law, and human services, and she previously held a position with a Welfare-to-Work program. She is assisted by an 18-year-old former participant who staffs the youth drop-in hours and supports the variety of activities youth are interested in at the center.

## Success of Implementation

Although the Mercy Housing NET centers have not developed a well established, formal evaluation program, the central staff team and staff at each center work together to understand the types of programming that best suit the needs of participants and to continuously refine their offerings. During our site visits, we were able to observe and record several events indicative of the how well the programs at the centers are being implemented.

At the SoMa NET center, we interviewed a senior who was a regular user of the CTC. Itzak is a 72-year old man originally from Russia who came to the United States in 1994. For our interview, he shared the family tree he had been working on for the past year at the lab. The document is written entirely in Russian and is an impressive piece of work, with text, graphics customized from clip art, and a smooth layout. During our interview with Itzak, the lab coordinator, Irina Verdiyan, sat in the background and every now and then Itzak would turn to her for translation assistance. She would either translate a word or phrase for him from Russian into English, or, at times, simply help him clarify his thoughts.

Itzak started coming to the computer lab when it first opened. He had received a flyer about the lab and wanted to create the family tree. He said that when he turned 70, his children surprised him by giving him a computer. But he added that he could not use it, even after it was set up by his children, because he did not know how. He started coming to the lab, as he explained, because he recognized that “computer is for future... [we] have to study how it works.” In the lab he has been assisted in all the details of using computers and the Internet by the coordinator, Verdiyan. Itzak said that through the family tree project, she has taught him how to use the scanner, wrap text around inserted images, and edit a clip art graphic of a tree for the cover page. He has come to the lab regularly since it opened to create the family tree because it is “for the next generation, to learn and remember Russian,” and he has had Verdiyan to help him.

The interaction between Itzak and Verdiyan—in which she has guided his practice and facilitated the authentic project that he brought to the lab—is the type of informal learning that demonstrates the power of CTCs. CTCs are not always the only points of technology access for those who lack it, but they are often the only place where participants can initiate projects and access the human support critical for becoming technologically fluent in a way that builds and sustains community. High quality relationships between staff and participants underlie much of the success of CTCs.

The most successful adult programming offered at the Eden House NET Center was a class offered by an extremely dedicated volunteer, David Cota, who is a staff member of a local non-profit serving the Latino community. When conducting focus groups at Eden House as part of his organization's outreach efforts, Cota found that residents were interested in computer classes. His involvement with the NET Center grew from these focus groups. Though he had no teaching experience, he drew upon classes on office applications he had taken in college to develop a curriculum, and taught a 2-hour class entirely in Spanish once a week for a year on computer basics. The class averaged 10 people or more per session. The challenges to teaching this class were formidable—participants ranged from 8-year-olds to seniors, the 10 students wanted to do 10 different things, several students could not type or spent weeks learning to use the mouse, and there were technical difficulties in the lab. Nevertheless, Cota was inspired by the motivation of his students and excited to share his knowledge with others.

Students in his class succeeded in learning to use email and conduct online research, scanned photographs of grandparents to share with far-off relatives, and completed a desktop publishing project—a newsletter with text and graphics. Cota worked hard to support his students' learning. Using his skills as an outreach and advocacy worker, he called every participant every week to remind them about class and ask them what they wanted to learn next. Cota believes that “as immigrants, people are looking for connections to home, country and culture.” He supported his students use of computer and online technology to make those connections by sharing family photos via email, finding images of their home countries on the Web, and finding Spanish-language content online.

## Challenges to Effectiveness

Along with the benefits that come from the centralized development of curriculum and materials for the seven Mercy Housing CTCs, there is also the risk of individual centers delivering programs that are formulaic and packaged rather than tailored to meet the needs of local participants. Additionally, it is evident that in some cases individual centers have relied on the central office to initiate innovative projects rather than take full initiative themselves. Despite these problems, each of the centers we visited had their own look and feel, programming structure, and approach; and center staff all recognized the importance of taking responsibility for implementing suitable programming. Overall, staff at each of the centers are working to find the balance between prepackaged programming, meeting the needs of the local population, and attracting new groups of residents at the property that could benefit from center offerings.

In addition to balancing the many factors shaping programming, the Mercy Housing NET centers also face the challenge of providing adequate opportunities for staff development across the seven centers. It has been difficult for leadership to physically bring staff together for planning or training. Additionally, staff members at the various centers are doing different types of work, ranging from one-on-one literacy tutoring, to video production, to science projects. The centers are at different stages of development, and the staff are working at different levels of skill and experience. Even conference calls have proven difficult to implement. Currently, Mercy's CRIs meet annually at a retreat, and the CTC executive team has worked to add a technology focus that emphasizes the importance of integrating technology access and training into the basic services. The lead team is also working toward implementing on-site meetings at the seven centers.

Other challenges to the program include:

- **School connections**—Mercy Housing is seeking to develop and maintain connections with schools to gather school outcome data on children and youth attending Mercy's CTCs.
- **Serving all language groups**—Residents speak many different languages at most of Mercy's CTC sites, reflecting the rich cultural and language diversity in California. Mercy has risen to this challenge, recruiting Spanish, Russian and Vietnamese-speaking staff and volunteers. Still, it is difficult to meet the needs of all residents. At the SoMa NET Center, for example, Mercy residents speak Spanish, Russian, Tagalog, Vietnamese, and a number of other Asian languages.

- **Financial sustainability**—Although Mercy’s NET Centers have been successful in attracting skilled and dedicated volunteers, they have found that they cannot sustain a full schedule of programming, especially classes, by relying on volunteers, who usually have conflicting commitments. Most of the centers do not have funds to pay instructors in addition to their lab coordinators, some of whom are only part-time Mercy staff. More importantly, Mercy has not yet secured sufficient funding to support the labs, even at their current staffing levels, beyond the Department of Education’s grant period.

## 12. Seattle Community Technology Alliance

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**Seattle Public Library, Seattle, WA**

### **Program Summary and Accomplishments**

The Seattle Community Technology Alliance (SCTA) provides support to seven Seattle-area CTCs that help low-income members of the community acquire basic technology competence and the ability to use technology to enhance academic skills, career opportunities, English proficiency, and personal growth. Together, these seven CTCs provide access to 140 networked computer workstations at strategic locations in underserved communities. SCTA resulted from a citywide effort begun in 1995 to increase digital access for all Seattle's residents, which led to the creation of an alliance headed by the Seattle Public Library to support the approximately 150 CTCs in the Seattle area. The alliance's mission was to help centers move beyond technology access and provide necessary coordination, programming, staffing, and technical support for local CTCs by developing a baseline set of services. The wide variety of corporate, governmental, and service-agency partners recognized that providing such support to large numbers of centers depended on being able to accomplish its aims first with a small number of centers and, once established, gradually build on a successful model.

To date, the alliance has contributed substantially to the operations and programming of each of the seven centers in support of positive learning outcomes for program participants. Participation at each center has increased many-fold since the beginning of the grant period, and programming has improved dramatically. SCTA has developed its approach sufficiently to expand its services and replicate its model to support other CTCs in the Seattle area. A major alliance contribution has been to help fund, train, and supervise the lab coordinators for each center. These individuals are key to the transformation that SCTA is effecting in local CTCs.

In addition to supervising and managing the day-to-day operations of the individual centers, the duties of the lab coordinators includes collaborating with peers to enhance professional development and cross-fertilization of ideas, sharing of programming resources, and mutual problem solving among the centers. Another of the alliance's primary strengths is that the SCTA coordinator and technical support person are able to

effectively channel technical and educational resources to the centers. According to stakeholders and evaluators, the SCTA labs have been transformed into more than simple drop-in centers for people already motivated to use them. Now they have started to encourage people to learn how to use the new technologies through the training offered by the CTCs.

The SCTA alliance is still in its early stages, not yet having expanded its operations fully beyond the initial seven centers. The alliance faces challenges in securing funding to sustain itself past the period of the Department of Education grant. Its other fundamental challenges center on the difficulty of providing assistance that supports individual centers while requiring them, simultaneously, to support the alliance. The greatest asset of the individual centers is their focus on and close relationship to their communities. However, the SCTA alliance is predicated on the idea that in order for these centers to improve their programming and move beyond their current state, they need to actively participate in a community of centers actively contributing to its goals and drawing from the collective experience of the members.

## Basic Strategies

### *Approach*

Led by the Seattle Public Library (SPL), the Seattle Community Technology Alliance is a collaborative whose founding partners include the following:

- Seattle's Department of Information Technology
- Seattle Housing Authority
- Seattle Department of Parks and Recreation
- Seattle Public Schools
- Chinese Information and Service Center
- Connect
- Women's Community Impact Consortium
- Powerful Schools
- University of Washington
- Millennium Digital Media

- One Economy
- and corporate sponsors AT&T, Cisco Systems, Gateway, and Microsoft.

SPL acts as the fiscal and administrative agent for the alliance, managing grant funds and project coordination. It was a natural choice to lead the new alliance, because it envisioned itself as a leader in integrating technology training into basic city services, and its “Wired for Learning” program was providing computer classes for people with low English proficiency and literacy skills. The seven CTCs supported by SCTA are located in community centers, housing projects, schools, and social service agencies.

SCTA, which aims to improve the “impact, effectiveness, and sustainability” of its seven participating centers, has four primary objectives:

- Program Services—Improve the range and quality of program services at partner CTCs.
- Lab capacity—Build a baseline capacity that includes hardware and software, Internet/network connectivity, staffing, volunteerism, technical support and business operations.
- Technical support—Develop a sustainable technical-support plan that ensures the long-term viability of the CTCs.
- Strength through Collaboration—Ensure the CTCs as a sustainable community resource through a collaborative effort to strengthen the CTCs as individual business units and as a force for technology and economic development in the community.

SCTA is an outgrowth of a citywide effort begun in 1995 to increase digital access for all Seattle’s residents. This effort resulted in the creation of the office of Community Technology Planner in the city government, filled by David Keyes in 1999, along with public Internet kiosks and contracts for high-speed connectivity for community technology centers. Once in office, Keyes convened a group headed by the Seattle Public Library to discuss the formation of an alliance to support the 150 or so CTCs in the Seattle area. The alliance was charged with helping centers move beyond technology access and provide necessary coordination, programming, staffing, and technical support for the area’s CTCs.

The overarching intention of the SCTA was to help centers develop a baseline set of services. The partners recognized that providing such support to large numbers of centers depended on being able to accomplish its aims first with a small number of centers and, once established, gradually build on a successful model. SCTA chose the initial set of

seven centers based on two primary criteria. First, the center had to be established, but also in need of significant inputs of equipment, programming, or staff. Second, the CTC's sponsoring agency needed to be able to match the federal funding levels that would be used to support the CTC.

The CTC at the Garfield Park and Recreation Center exemplifies how the alliance supports the centers it selected. Based on a request from Garfield management, a volunteer group from the Technology Access Foundation installed the hardware, software, and network connectivity to create a computer lab. But the center had insufficient support to make its operations viable—there was no one to monitor the lab and minimal training for staff. As a result, the equipment was misused and fell into disrepair. However, since that time, SCTA has provided funding for a lab coordinator, technical support, and resources for program development. Because of the alliance's intervention, the center has thrived, with participants both regularly using and actively engaging in helping to maintain the lab.

Daria Cal, the SCTA coordinator, and Robert Valiant, the technical support coordinator, have been implementing the grant since it was awarded. Cal's professional experience includes work with the public library in both technical and educational capacities. As SCTA coordinator, she works with the centers to address programming and staffing needs; she also supervises the technical support coordinator. However, her responsibilities have shifted somewhat during the life of the alliance. For example, the first year she focused on basic operations, which included such tasks as developing working relationships with the lab coordinators, surveying existing program offerings, and determining program development needs. At that early stage, the lab coordinators were hired by the host organizations. But, as it became necessary to hire replacement lab coordinators in the second year of the project, Cal sat on the selection committee so she was able to help shape expectations for that role. At present, she continues to develop the SCTA model for future expansion and manage resources across centers, locating and distributing appropriate curriculum, professional development supports, and assessment tools. She also manages the SCTA partnership with local universities and colleges for work-study student volunteers who supplement the staffing at the labs.

In his role as technical support coordinator, Valiant has been working to create a baseline technical infrastructure for all the labs with enough standardization to facilitate

cross-site technical support. He has worked closely to support the individual lab coordinators, since, as he states it, the goal has been “to support coordinators, not equipment.” In his effort to promote technical proficiency at each site, he has developed mentoring relationships with three young participants at the Garfield Center who are interested in being part of the site’s technical support team. Valiant has the ability to work flexibly with staff and volunteers with diverse abilities and expectations. This helps him find a balance between his standardized approach and the individual needs of each center. Valiant also has created a tracking system to monitor lab use, which he has been working to implement. Among his many other duties, he coordinates security measures across the labs, adjusts set-up configurations, and addresses compatibility problems between some of the staff’s favorite educational applications and Microsoft’s operating systems.

A major alliance contribution has been to help fund, train, and supervise the lab coordinators for each center. These individuals are key to the transformation that SCTA is effecting in local CTCs. SCTA did not fund staffing at all centers equally; centers that already had staff—those hosted by schools and community colleges—were given enough funding to support a quarter-time position. The three centers hosted by Seattle Parks and Recreation and the Chinese Information Service Center were funded for a half-time lab coordinator. In addition to supervising and managing the day-to-day operations of the individual centers, the duties of the lab coordinators includes collaborating with peers to enhance profession development and cross-fertilization of ideas, sharing of programming resources, and mutual problem solving among the centers. The lab coordinators and support staff are assisted by college work-study students and community volunteers.

Another of the alliance’s primary strengths is that the SCTA coordinator and technical support person are able to effectively channel technical and educational resources to the centers. When we spoke with Annie Laurie Armstrong, the program evaluator, she noted that she is in a position to be able to compare the development of the SCTA-supported labs with other labs in Seattle that are not part of the alliance. Her observation is that even in its early stages of development, the SCTA model of supporting its CTCs makes a big difference in outcomes. The SCTA labs have been transformed into more than simple drop-in centers for people already motivated to use them. Now they have started to encourage people to learn how to use the new technologies through the training offered by the CTCs. She notes that the populations using the labs have changed over the few

years of SCTA's involvement. She sees more diversity in participants—a wider range of ages, and more women, immigrants, and ethnic groups. In addition, the labs have become more integrated with neighboring employment programs. She observes that SCTA has influenced labs to plan for sustainability, develop practical business sense, and think about outcomes and documentation. She notes,

I've seen many smaller CTCs that don't have that kind of attention become more of a drop-in [center], which is good for a highly motivated individual, but not necessarily a service for people that would really need more encouragement and direction to be able to use the lab productively. [The SCTA CTCs are] not just another community resource, but are playing a true advocacy and educational role for communities.

SCTA represents a particular type of approach to supporting CTCs—one in which a new entity (an alliance) is formed to enhance the operations and programming of an existing set of diverse and unrelated CTCs. The approach taken by SCTA entails several types of relationships, each of which must work adequately to make the alliance succeed overall. These four key relationships are: 1) between the partners that form SCTA and the alliance; 2) between the SCTA staff and the lab coordinators at each center; 3) between the individual labs and the host agency; and 4) between each lab and the community it serves. Because of the diversity in the way each of the centers is organized and operated, there is a great deal of complexity in these four relationships.

### ***Programming***

An overview of the four centers that our research team visited, with brief descriptions of their programming, is presented below.

- **Chinese Information and Service Center (CISC) CTC**—This center, located in Seattle's International District, provides access to multiple social services for over 3,500 ethnic Chinese individuals annually. The technology lab, which had no structured classes and primarily served only youth before becoming part of SCTA, now serves several hundred people per year, and offers basic computer classes and open-access hours for youth, adults and seniors. The center also offers technology-supported Mandarin classes, and has developed an intensive class called CyberCamp, which targets new immigrant youth with little to no experience in using computers. They learn the basics of keyboarding, word processing, desktop publishing, Web design, and making PowerPoint presentations. The center has

recently added a new program called Job Search Center, which focuses on Internet job searching, electronic resumes, and other employment topics.

- **South Park Community Center CTC**—This lab is located in a very poor industrial neighborhood with no library or services other than the community center. Since joining the alliance, the lab has provided a basic Word and ESL class to serve the largely Spanish-speaking residents of the neighborhood. Regular programming has expanded to include: intermediate Word for Spanish-speaking adults, a youth homework club, Word for adults, Internet for adults, and a seniors' class. Summer programming includes a day camp computer club, a teen computer club, an adult Vietnamese class, and a video production class for teens. The South Park lab has the distinction of having inspired local residents to hold grass-roots fundraising events for computer lab supplies and staff, such as a Mexican theme dinner/dance.
- **The Garfield Community Center CTC**—With the help of SCTA, the Garfield CTC, located in the heart of Seattle's Central District, has been able to offer a full range of programs and keep the lab open seven days a week. It offers weekly classes in basic computing for children, youth, adults, and seniors. It also offers adult basic education courses, career development programs, life skills training, multimedia design for teens, and educational-enhancement programs for school age children. Garfield has partnered with several training and community education groups to provide its programming. In the six months after Garfield joined SCTA, monthly attendance by new participants increased from 22 to 121, monthly attendance by returning participants increased from 9 to 401, and monthly attendance overall increased sixteen-fold from 31 to 503.
- **Yesler Community Center CTC**—The Yesler lab is situated in the Yesler Terrace Garden Community, a Seattle Housing Authority public housing development that provides a variety of basic social services to its very low-income residents, many of whom are recent immigrants and speak limited English. The CTC is an integral part of the health, education, refugee, and other services provided for residents. The center offers classes in basic computer skills for participants of all ages, has developed a career skills and job-training program, and supports a variety of school-age programs. These include a preschool class, a Web design class for middle and high school students, and leadership training for youth technology mentors who volunteer in the CTC.

## Success of Implementation

After its first two years of operation, SCTA is able to point to a number of accomplishments. Its efforts have noticeably increased usage and broadened the constituencies of the CTCs. Programming has also improved dramatically at the centers.

Overall, the SCTA has fostered strong shared values and encouraged the development of long-range plans among the seven CTCs in the alliance. But one of SCTA's most important accomplishments is the integration of technology access programs into existing

community services. K-12 and post-secondary schools, employment development agencies, the Seattle Housing Authority, and Seattle Parks and Recreation all are starting to include the CTCs in their vision. The Seattle Parks and Recreation department, for example, has called upon SCTA for user data to support the department's policy shift towards inclusion of technology. Based on its success in implementing its model at the seven initial CTC sites, the SCTA is moving to support other CTCs in the Seattle area. One advantage of an working within an alliance like SCTA is that it gives small community-based organizations the benefit of working with more established institutions, such as the city government, library, and universities. These institutions have the infrastructure necessary to apply for and implement large grants—an advantage that may help the CTCs continue in some form beyond their Department of Education funding.

During visits to individual SCTA centers we observed many of the positive outcomes resulting from the centers' participation in the alliance. Some of them are described below.

### **Chinese Information Services Center**

At the Chinese Information Services Center (CISC), the technology lab, located at the rear of an office, is stuffed with three rows of computers. Prior to the alliance, the city of Seattle had placed only three computers in the center. This CTC is the only computer training and Internet-access facility in Seattle that offers bilingual Chinese-English programs. There is high demand for the center's services. Classes accommodate 24 people, and there was a waiting list of 40 non-English speakers in the fall of 2001. In order to best serve its community, the center refers people who want computer classes in English to other centers or the community college. The lab is always searching for volunteers or teaching assistants who have both the necessary language and technical skills to support its bilingual programming.

Many elderly participants come to the lab from adjacent housing projects and the Sunshine Garden Senior Daycare center in the basement of the CISC building. Karia Wong, the lab coordinator, has taken steps to address the special needs of senior students. Since seniors need more attention while learning, Karia found that a 1:3 teacher/student ratio works best for them, compared to the 1:10 ratio for other adults. Seniors also help each other and receive assistance from younger students. When we visited the site, seniors

were learning how to use the Internet and do word processing in Chinese. In a cultural heritage project, they write their own biographies, edit them on the computer, and print them out as a book. The seniors (as well as other students) also enjoy creating electronic photo albums, and are now able to turn to the Internet as a source of news about China, novels, and songs—all in their own language. The CISC, which recently set up a computer with a 56K modem in the senior center, is offering a program in which students use the Internet to learn about the history of Seattle, along with workshops on the benefits of Internet use.

Computer concepts and functions are introduced by having small groups of students set up and install software on a computer. Teaching methods vary, depending on the composition of the class. Students who have been through the lessons previously act as peer helpers. In one teaching activity, volunteers staff several stations that are equipped with a peripheral, such as a camera, scanner, or CD-ROM. Students rotate through the stations in small groups, taking one hour to work with each device. To explain computer basics and peripherals, Wong, who is originally from Taiwan, developed a special handout with lots of pictures of devices and text in Chinese. The content is simple, showing different kinds of keyboards, the four areas of the keyboard, the mouse, and five things a mouse can do. The handout has blank lines for students to write in the English names of devices and record their notes. Wong uses the handout together with exercises on finding the items on the Internet.

Such efforts seem to be paying off. Wong tells stories about former students whose ability to use information technology enhanced their lives. One student, who purchased her own computer after taking CISC classes, told Wong that her newly found confidence with using computers means that she no longer feels helpless. She now reads Chinese news online and has become the daily news reporter at the Sunshine Garden Daycare Center, a position which gives her a great deal of pride.

### **South Park Community Center**

The South Park Community Center, run by the Seattle Parks and Recreation department, is located in an older working class area tucked in between a highway and a river, hemmed in by the Boeing industrial complex. This neighborhood has no library, senior center, or middle or high school, and is cut off from major public transportation.

In this underserved community, the South Park CTC provides the only source of free technology access to most of its users, who consist primarily of Latino elementary and high school students. The majority of lab users are boys, but Ellen Earth, the lab coordinator, has started a “girls club” and added links of interest to girls on South Park CTC’s Web page. Earth wants to instill her young users with a passion for “learning how to learn.” She envisions the lab as a place where young people acquire technology experience that they pass on to their families and other members of the community.

During our visit, we observed a steady stream of young people filling the lab. Children were playing video games at the Disney, Cartoon Network, and Nickelodeon Web sites, surfing the Internet, and instant-messaging in Spanish. One young man worked on vocabulary “word search” exercises on an ESL site. Before young users are allowed to play computer games, the rule is that they must spend 30 minutes at an educational activity, which might be typing practice, school homework, or a directed assignment that pops up when the students log on. Some of the teens used digital video to record a recent meeting with the mayor about funding for next year, which they will use in a PowerPoint presentation about their neighborhood. Teens are also involved in building computers from recycled components and designing computer games—the most advanced technical work we observed on our lab visits—and lab coordinator Earth is proud of such achievements. She says she sets high expectations with real consequences and then empowers students to “do what is right.” Self-responsibility and accountability to others is an important lesson she wants the young users to take with them from their lab experience. “These are the citizens, they are the ones who are going to be taking care of me when I’m old. They are learning to take responsibility.”

Despite the high demand for its services, the South Park center is working hard to attract more community members who might be reluctant otherwise to explore its offerings. Its outreach efforts include a bilingual class and a computer give-away program (in exchange for volunteer hours)—a strategy to bring families into the center and attend the library’s “Wired for Learning” class. The lab instructor from the local school district is helping with outreach by creating a series of classes to bring in the parents of youth participants—thereby getting whole families involved. South Park’s participants stand out in their commitment to the CTC; they have held dinner dances to raise general funds and buy specific pieces of equipment—such as a digital camera—for the lab. Even teens have

pitched in, giving them the opportunity to literally “buy-in” to the project by identifying needs and meeting them. This high level of community support for the South Park CTC extends to the Seattle Department of Parks and Recreation, which has indicated its support for the idea of including CTCs within its community centers.

### **Garfield Community Center**

The Garfield Community Center is located in an older neighborhood with many single-family homes and apartments. Garfield has traditionally been an African American community, but is experiencing increased diversity as whites and Asians move in. Angela Rye, the lab coordinator, is a senior at the University of Washington (UW).

The lab’s close relationship with UW contributes to its active and diverse volunteer base, which is one of this CTC’s strengths. It has two Japanese interns from Bellevue Community College, and volunteers from UW monitor the lab and provide instruction from 10–4 p.m. every day. The UW students are provided through a service learning program in which they work 20 hours per academic quarter for credit. The lab also has a partnership with UW faculty, an important asset which allows the lab to have more open hours. The connection to UW provides resources that could be passed on to other labs through the SCTA collaboration.

The Seniors Training Seniors class has a waiting list every month, and the Wired for Learning classes through the Seattle Public Library are also quite popular. For children, the focus is on computer and Internet basics and projects. Older children type journals and stories, conduct Internet searches, and learn basic computer skills—activities that few of them have the opportunity to do at home or at school. Teenagers, on the other hand, have been less interested in the center’s programs because they have sufficient access at school and can go to the nearby Teen Life Center, which has more digital multimedia resources. Nonetheless, lab coordinator Rye has tried to find out what types of programming might best meet teens needs—such as college prep and career development courses—and to provide these when possible.

Rye judges her own effectiveness through the individual relationships she has been able to cultivate with learners. She sees their gratification with accomplishing a task, knows repeat visitors, and sees about one new user a week. Her vision for the children is that, by participating in the lab, they will be more technically fluent than their peers at

school or those who have computers in their homes. Beyond “just searching the Internet” she wants them to be able to use many applications and help their parents and others.

### **Yesler Terrace**

The Yesler lab is located in the Yesler Terrace Garden Community, a Seattle Housing Authority public housing development. The Yesler Terrace center calls itself a “Learning Lab” rather than a CTC because of various learning programs it offers, such as ESL classes for Vietnamese seniors living in the community. Catholic Services also has a tutoring program in the space where the lab is located.

Lab Coordinator Asfaha Lemlem is an Ethiopian immigrant who has worked as a network support technician in several non-profit organizations that serve the East African immigrant population. His ethnic identity and immigrant background are important because many of the people living in Yesler Terrace share his experience and/or language. Winning the trust of East African potential lab users is a slow but important part of his work. Lemlem set up this lab two years ago as part of the SCTA grant—the only new lab created by the project.

The lab spaces are crowded with computers and users. Five computers were purchased and set up with software for ESL classes that are held three days a week. Asfaha facilitates the use of the technology by finding interesting Web sites for users and setting up email accounts, but the classes are taught by outside teachers. (Lemlem sees his job as a coordinator of services rather than as a technician, computer lab instructor, or community organizer.) Yesler Terrace hasn’t used the Seniors Teaching Seniors program because its programming needs to be tailored to the language and ethnic backgrounds of residents in the complex, especially East Africans and Vietnamese seniors. Many of the adults at Yesler Terrace could use adult basic literacy classes, but available city programs have criteria that exclude them. Lemlem is working with the community college to set up classes that will prepare community members to attend the community college.

Most of the lab users are children who are given a 30-minute orientation to the day’s activities when they come in. In addition to planned activities, the children are given one hour to do work on their own. Earlier in the year the lab was part of a six-week arts, culture and technology program in which the finalists were awarded a computer. Students

took photographs, learned how to develop them in a darkroom, and edited them in PhotoShop. There are nine volunteers that Lemlem recruited from nearby Seattle University.

Lemlem has noticed that young users who used to need a lot of assistance from the volunteers now initiate and work independently on word processing, PowerPoint, downloading homework, creating CDs, and using some programming languages. They also learn from each other more often, rather than turn to an instructor. Lemlem follows up personally to learn what happens with lab students in the long term. As a result he knows whether someone has gotten a job or achieved other outcomes that are not officially recorded by the program or by the pre- and post-tests that he administers. While most participants come from the Yesler Terrace housing community, recently there have been new people from the Capital Hill neighborhood who come to use the Internet. They prefer the Yesler lab to the library access sites because there are fewer time limitations.

Looking toward future sustainability, Lemlem is developing a business plan that includes charging for classes. His plan is to charge \$25 to 30 for a class to encourage consistent participation, and to return the fee if the student completes the class. One of his goals is to integrate second language instruction with the lab's technical resources. Lemlem is planning for sustainability through involvement with partner organizations. Its collaborations are one of the strengths of the Yesler Learning Lab, and Lemlem is committed to staying with Yesler Terrace as long as it takes to realize his vision for its potential.

Lemlem's degree of involvement in the SCTA collaborative is demonstrated by his data collection and reporting efforts. He has benefited from the information and resources SCTA has provided on recruiting volunteers, developing curriculum, using new software, and identifying leads on national grants. He also has developed a set of learning objectives for each of the center's classes, a practice advocated by the SCTA. Although the lab must follow housing authority rules, Lemlem appears to enjoy the autonomy to develop and direct the lab according to his assessment of its needs. Unlike other lab coordinators he also has had the autonomy and time to participate fully in the alliance's activities.

## Challenges to Effectiveness

One of the fundamental challenges for a model like the SCTA alliance is that it must necessarily function on two levels. The first is the level of the individual center. Repeatedly, it was emphasized to us that the strongest elements of the CTC's are their commitments to and relationships with the communities they serve. As Seattle Community Technology Planner David Keyes says, "What makes a community tech center is the ability of staff to know and analyze their own community." Or as Angela Rye, lab coordinator at the Garfield CTC puts it, "my loyalty is to this lab." For the lab coordinators, the CTCs are not just a job— they are part of their personal identity.

At the same time, one of the primary purposes for forming the alliance is collaborative development, a vision that has been difficult for SCTA to fully realize. For a period of time, SCTA Coordinator Daria Cal attempted to hold regular meetings of lab coordinators, but they participated irregularly, indicating low commitment to the collaborative spirit the alliance is striving to engender. The effort to form a true collaborative has created tensions in the relationships among centers and between the labs and the alliance staff. Cal experiences this tension most acutely when attempting to implement standardized data collection procedures or when trying to help centers share their resources and materials with one another. Cal continues to serve as the main conduit of information and resources between the sites, sharing observations and artifacts she has collected at one center with staffers for whom these resources might be useful at another. In retrospect, the SCTA steering committee realizes that stronger collaboration could have been built by mandating responsibilities to the alliance on the part of host organizations. For example, the job descriptions of lab coordinators could have been more clearly defined to provide a consistent understanding about reporting relationships and expectations for collaboration and data collection. Additionally, Cal realizes she should have made herself part of the hiring process for lab coordinators from the start, a situation which she has corrected. (Hiring was originally conducted by each host organization separately.) In general, Cal believes that stronger partnerships, with deeper consensus and buy-in, as well as clearer reporting responsibilities and accountability for data collection, will enhance chances for the alliance's continued successes.

While it has been difficult for Cal to obtain data regarding daily activities at the CTCs, SCTA evaluator Annie Laurie Armstrong worked closely with the host organizations to allow her to observe the development of the CTCs over time. Through our interviews, it became apparent that the SCTA steering committee members share a common understanding of the strengths and challenges of the organization. In addition to the evaluator's work, the Environmental Health and Social Policy Center, under contract with the Seattle Housing Authority, is conducting studies of sixteen Seattle CTC's, including a number of the SCTA sites. They chose sites that have gone beyond a start-up phase to discover what makes programs successful and sustainable. This research is expected to help the city use its resources better.

Despite its challenges, alliance leaders are optimistic that in Seattle, community technology centers will assume a role that goes beyond bridging the digital divide. David Keyes shared this vision of the community technology centers:

The greatest value of the CTC's is that they are community-based locations for lifelong learning. Whether grassroots-based or instituted by the city, the centers have the ability to draw together users for creative collaboration, to expand the use of technology from a consumer objective to a medium and organizing vehicle for the expression of civic and creative voices.

## 13. Appalachian Technical Education Center (ATEC)

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### **Douglas-Cherokee Economic Authority (DCEA), TN**

#### **Program Summary and Accomplishments**

The Appalachian Technical Education Centers (ATEC) in Northeastern Tennessee provides access and basic technology education to a rural population with few other technology resources. The Appalachian Technical Education Centers are administered by the Douglas-Cherokee Economic Authority (DCEA) and serve a large, rural, four-county area in the Appalachian Mountains of Northeast Tennessee from which it draws its participants. Some of the centers are located in small towns or villages and others are located on rural roads several miles from the nearest town. By partnering with a variety of social service and educational agencies, the DCEA has been able to extend access to computers and the Internet by providing 87 networked workstations for users in rural and remote areas. The DCEA also has been able to add or enhance computer and Internet skills training services provided at sites operated by these agencies.

Programming at the centers successfully serves a variety of participants needs, including: academic support for school children and basic education services for adults; job training and small-business-development resources; and personal enrichment and identity building. Additionally, ATEC school-based programs have encouraged parents to spend more time and get more involved with their children's education. ATEC's staff are intimately connected to the communities they serve, but have varied levels of technology skills. Currently, all staff seems to have gained sufficient skills and comfort levels with technology to be effective in their roles as instructors and providers of technical support to ATEC participants. Impressively, the staff meets at least twice a month to discuss, refine, and schedule their classes.

In their second year of operation, ATEC reported an unduplicated participant count of 883. Of these participants, 331 disadvantaged individuals reported an improvement in their computer knowledge of 30% or greater. Fifty-five participants attended job skills training programs. Participants at four of the nine ATEC centers completed nearly 550 separate courses, workshops, or specialized programs. (These centers only report numbers

of participants who have completed courses.) Individuals using these four centers spent 791.5 hours studying for the GED exam. Small business owners made 134 visits to these centers during open access time, spending 663.5 hours developing their marketing, accounting, research and Web design skills. In the 1,216 hours of open access time offered at the center, there were 5,244 visits, during which 47 participants completed online courses, 162 participants conducted online job searches, and 18 prepared for the GED exam. A six-week summer computer camp provided by one of the centers served 131 middle-school students.

Although the main mission of ATEC has been to serve female heads of households, the primary users of ATEC sites appear to be youth and seniors. Childcare and transportation are significant barriers to participation for single mothers. Through its partnership with the state welfare-to-work program, ATEC does provide training and job search services to many single mothers, but voluntary participation and use of open-lab times by this target group seems to be limited. Still, ATEC has reached large numbers of participants from a variety of backgrounds, and is currently facing its largest challenge: securing funding to continue its programming.

## Basic Strategy

### *Approach*

The Appalachian Technical Education Centers are administered by the Douglas-Cherokee Economic Authority (DCEA) and serve a rural, four-county area in the Appalachian Mountains of Northeast Tennessee. The four counties served by ATEC cover a 1,300-square-mile area with a total population of just over 100,000 people. The centers in Hancock and Grainger Counties were first funded by a CTC grant received in October 1999. The centers in Hawkins and Claiborne Counties were funded by a second CTC grant in October 2001. All four counties have high poverty rates and represent a portion of the "Clinch Powell Enterprise Community" Economic Empowerment Zone. Unemployment, inadequate housing, and low levels of educational attainment are also problems in the region; of the 6,484 individuals over the age of 25 in Hancock and Grainger counties, for example, 43% have less than a ninth grade education. The office of the Douglas-Cherokee Economic Authority is located in the largest city in the area,

Morristown, Tennessee, but none of the ATEC sites are in major population centers of the area. Some of the centers are located in small towns or villages (Sneedville, Arthur, Rogersville) and others are located on rural roads several miles from the nearest town (Flat Gap, Clinch School, Elm Springs Baptist Church). The ATEC sites draw participation from a large area. Some participants reported traveling 15 or more miles (typically on winding, mountain roads) to reach an ATEC site, and some said that they also travel to more than one of the centers.

By partnering with a variety of social service and educational agencies, the DCEA has been able to extend access to computers and the Internet to rural and remote areas. The DCEA also has been able to add or enhance basic computer and Internet skills training services provided at sites operated by these agencies. The partnership with the Jubilee Project, a community development project supported by the United Methodist Church, illustrates how this approach has worked. The director of the Jubilee Project, Steve Hodges, had received a loan from the Tennessee Valley Authority to set up a small computer lab in Sneedville. By partnering with the DCEA and winning the CTC grant, the Jubilee Project was able to acquire new computers, add an instructor, and stop charging for use of the lab. The Jubilee Project provided two sites for ATEC; the Jubilee Center in Sneedville and the former Flat Gap Elementary School converted by the Jubilee Project into a community kitchen and computer lab. Because the Jubilee Project is affiliated with the Methodist Church and most residents of the area are Southern Baptist, Hodges put ATEC director Cathy Wyatt Kitts in touch with Delmont “Seven” Gibson, the pastor of the nearby Elm Springs Baptist Church. Gibson offered to put a CTC in the fellowship hall of his church. The partnership with Gibson led in turn to the formation of a partnership with the Of One Accord Ministry, a Baptist-affiliated mission that operates the Shepherd’s Corner thrift stores and food pantries in Sneedville and Rogersville. As a result, a small computer lab was set up in the Sneedville Shepherd’s Corner and later, a larger one in the Rogersville Shepherd’s Corner.

Beyond the partners who provided space and support for community technology centers, partnerships were formed with a number of organizations to provide referrals of participants to ATEC. In the initial 1999 CTC grant, four organizations were enlisted as partners to provide participant referrals:

- Grainger County and Hancock County Departments of Human Services
- Hancock County Recreation Program
- Upper East Tennessee Human Development Agency
- East Tennessee State University Workforce Investment Act Program (“Families First”)

The 2001 CTC grant enabled three more to be enlisted:

- Claiborne County Department of Human Services,
- DCEA Workforce Development Program,
- Tennessee Department of Labor Workforce Development Program

These referrals are complemented by the active outreach ATEC conducts through extensive distribution of fliers and newsletters throughout the region served by its centers.

Because the focus of ATEC is community development and support for employment and small business development, the partnerships with existing community projects was an opportunity to enhance the effectiveness and range of services available by adding access to technology and training in basic computer and Internet skills. The establishment of the computer lab adjacent to the Jubilee Project’s community kitchen at the Flat Gap Elementary School is a good example of the value added by the CTC to the Jubilee Project’s ability to support small business development. The use of the ATEC computer labs by Families First clients for basic computer skills training and for online job searches is another example of the value added by the CTC grants.

Beyond setting up computer labs and providing training in basic computer skills in rural areas where no such access existed, the vision of ATEC also included creating an environment in which local people who most needed to acquire basic skills would feel comfortable. Director Cathy Wyatt Kitts felt that her experience as a student and as an instructor at a local community college had taught her that the college environment was a barrier for many in need of educational services in the Central Appalachian region. More amenable environments were needed for people in the region who would not feel welcome or comfortable in community college classes because of differences in class, dialect, and experience that separated them from college faculty and many students. Kitts kept this need in mind in selecting sites and in selecting staff for the ATEC. The expansion of the partners in Sneedville to include Baptist as well as Methodist-affiliated

sites was part of the effort to create this comfort zone. Another effort to address this need was the hiring of local people as ATEC staff—indigenous educators who know the local community because, in the words of Kitts, they have “lived it, lived with it, and had family with it.”

In the process of hiring staff for the ATEC, Kitts first described the position as “educator/counselor.” In Kitts’ view, it was important that staff understand that their role was to provide more than basic computer skills training and technical assistance. The emphasis on recruiting “indigenous educators” and the shortage of applicants with high-level technology skills in the area (coupled with the relatively modest salary that could be offered) resulted in the hiring of the eight current ATEC staff members. These employees are intimately connected to the communities they serve, but have varied levels of technology skills (some have had to acquire new skills to stay one step ahead of their students). In the first year of the original grant, one of the staff members who had a B.A. in computer science was able to play a key role in developing the basic computer skills curriculum and courses used throughout ATEC. This staff member also was instrumental in providing in-house professional development for other staff. Currently, all staff seem to have gained sufficient skills and comfort levels with technology to be effective in their roles as instructors and providers of technical support to ATEC participants. The fact that they are local people who have demonstrated their own ability to acquire technology skills seems to be a strong motivating factor for participants, and encourages the perception of ATEC staff as “co-learners” and facilitators (even though the courses they teach use traditional lecture and drill-and-practice methods of instruction). The staff meets at least twice a month to discuss, refine, and schedule their classes.

Cathy Wyatt Kitts is clearly an effective leader and the driving force behind the realization of the ATEC vision. With the initial CTC grant, and with the second grant expanding the range and number of ATEC sites, Kitts was able to effectively use her own extensive network of connections in the schools, communities, and churches of the area to form partnerships, identify sources for participant referrals, and recruit staff from within the communities served. Kitts attributes some of her organizational skills (as well as her access to social networks) to the fact that she is a preacher’s wife (as are several other ATEC staff). Her skills and connections have been critical to the successful establishment

of ATEC community technology centers in rural communities typically hesitant to embrace ideas and organizations they see as coming from the outside.

### *Programming*

ATEC centers offer the following general computing courses: Introduction to Computers, Advanced Intro to Computers, Internet and E-mail, Windows 98, Word, Keyboarding, Access, Excel, PowerPoint, Publisher, T-Shirt Design Using Publisher, Quicken, Digital Photography, Internet Research, How to Store Data on a CD, and a 30-hour certificate in computer applications. They also offer “employability skills” classes: Resume Writing, How to Prepare a Cover Letter, and Job Searching Using the Internet. Some centers offer small business workshops, including: Developing a Business Card, Marketing Your Product Using Publisher, Web Site Design, Conducting Business Research, Accounting, and Income Tax Preparation, among others. ATEC centers provide open lab time for individuals studying for the GED exam to use Learning 2000 software, and they provide large amounts of general open access time. The Sneedville Center provides a six-week summer camp including instruction in various software applications and the Internet for middle-school youth.

ATEC staff use a standard curriculum adapted from community college courses for its regular classes, which last a total of six hours. They can be a six-hour session (1 day), three-hour sessions (2 days), or two-hour sessions (3 days). The centers also offer individualized one-on-one instruction. In this case, individuals can schedule meeting times with ATEC staff members, who design a program or sessions that meet the clients’ needs. Open-lab opportunities allow clients to learn and work at their own pace. If they have questions, educators are present in the lab to help them. All of the centers have open-lab times. Schedules for hours of operations, open-lab times, and courses are published in monthly newsletters that are distributed widely (8,000 copies) in the four counties served by ATEC. Some evening hours for classes and for open lab are available at most sites. All of the ATEC community technology centers are equipped with a fax/copy machine, a printer, and current software, including: Windows 98, Microsoft Office 2000 (Word, Excel, PowerPoint, Access, Publisher), Quicken, Quickbooks, Mavis Beacon Typing, ACT Prep, Learning 2000 (GED preparation), Adobe Photoshop,

Internet Explorer, Outlook, and various software provided by participants. Almost all centers have high-speed Internet connectivity.

Brief descriptions of some programmatic and physical features of the ATEC sites follow:

- **Flat Gap**—This site primarily serves local business and farm owners in the area. The community kitchen at the site is used by several local entrepreneurs to process farm goods for specialty markets. Several small business operators use the technology classes and the computer lab for business purposes (such as creating business cards, Excel spreadsheets, labels for canned goods, advertisement flyers, and so forth). This center is located in a former elementary school building that now houses the CTC and the community kitchen. The building is supported by the Methodist-affiliated Jubilee Project. The CTC facility has adequate space for its eight computer stations. It also has sufficient space for growth.
- **Elm Springs Baptist Church**—This CTC has been particularly successful in helping participants learn technology through projects they have initiated on their own. One woman, for example, who had little previous experience with Microsoft Publisher, made her wedding invitations, labels, and thank-you cards using this application. The center is located in the back of a church fellowship hall located in a separate building about fifty yards from the church itself. There is adequate space for its six computer stations, fax/printer, and educator desk.
- **Claiborne Adult Learning Center**—Claiborne Adult Learning Center uses its computers to prepare and administer the GED exam and for other adult basic education activities. The adult learning center is a two-story building located in the center of downtown. The center comfortably accommodates fifteen computers, two long worktables (located in the center of the room), and an educator desk (with a computer).
- **Clinch School**—The CTC is located in a science classroom in the school, and provides twelve workstations for participants' use. Based on feedback from the staff, the CTC location overall has been beneficial for both the school children and the CTC clients who visit the center.
- **The Shepherd's Corner, Sneedville**—The CTC is located in the Shepherd's Corner community thrift store in the central business district of the village of Sneedville. A small room in the back of the thrift store (actually a large closet) has been equipped with two computers. The fact that it is inconspicuously located at the back of the thrift store has made it an attractive place for participants who might feel uncomfortable in a more public setting. According to ATEC staff, this space is ideal for older couples who want to learn basic computer skills in a semi-private setting. In addition, due to limited available space, cost and maintenance issues for the CTC facility are minimal. The thrift store is supported by a Baptist-affiliated organization, Of One Accord Ministries.
- **The Shepherd's Corner, Rogersville**—Families First participants use the CTC computers to take career inventory assessments. The results help the educators and

the clients discuss possible career options. There are five workstations for participant use at this site.

- **Arthur Community Center**—The CTC is located on the stage of a neighborhood community center in the village of Arthur. The center sufficiently accommodates its nine computers and the clients it serves. This is the only ATEC technology center that does not have Internet service as yet. Also, having the center open in the evening has not been possible because of neighbors' concerns about noise and traffic.
- **Jubilee Project, Sneedville**—Project-oriented programming for youth and seniors are important aspects of the approach at this center. There are thirteen workstations for participant use at this site.
- **Washburn School**—Washburn is a K-12 school that provides 21 workstations for participants' use. This site was not visited.

The ATEC centers use a curriculum that builds on conceptual understanding of the computer and software in a developmentally appropriate manner. For instance, the introductory class, which explains various computer functions, is generally required before more advanced classes such as Microsoft Excel, PowerPoint, or the Internet are taken. Several educators stated that they help guide clients to developmentally appropriate classes. Within courses, developmentally guided class activities to help students learn and understand the class material. For example, after working with the students on different symbols and functions that can be entered on a Microsoft Word document, an instructor at the Claiborne Adult Learning Center gave the class a culminating exercise. The worksheet had mathematical conversions for the class participants to retype in a Microsoft Word document. The worksheet included numbers, letters, parentheses, quotations, bold, and various other symbols and functions.

Instruction at the ATEC sites tends to take the form of traditional, teacher-led step-by-step teaching of basic computer skills or individual practice and project work. There is moderate evidence of intentional use of inquiry-based or project-based approaches by ATEC staff, though many participants appear to be self-directed learners who receive informal support and technical assistance from staff in learning software and using it for projects. The "Rowdy Bunch" at the Jubilee Project site, discussed further below, lobbied for a time for more varied and customized course offerings, but eventually realized that they could organize their own learning and teach each other whatever new software or computer skills they wanted to learn.

## Success of Implementation

The ATEC sites and courses have provided support to many small businesses. Training in digital photography has been a popular attraction for bringing in participants to the ATEC sites and has been a useful tool for small business. One ATEC participant uses digital photography as a key support for his real estate business. He takes photos and creates montages of land and structures that he uses to market local real estate to potential buyers who live outside the area. Through courses and frequent visits to a couple of the ATEC sites, he has been able to master digital photography and digital processing of photographic images.

Several participants have made use of training in Microsoft Publisher to produce labels, flyers, and other print materials to advertise and market their small businesses. This includes a local woman who owns and operates a dairy goat farm and uses the ATEC computer lab to design and print labels for such products as goat milk fudge. Another participant has used the training, technology, and technical support available at the ATEC sites to create a range of print materials to support his garlic marinade business. All three of these small business owners have made extensive use of the ATEC facilities in support of their business development.

Other local entrepreneurs have benefited from opportunities to market their products online with support from ATEC. Small business operators have also formed new social networks through the center. Several business owners seem to spend a good deal of time in the centers learning new skills and simply doing the work of their business. The partnership with the Jubilee Project (including the folk crafts collective at the Jubilee Center and community kitchen at the Flat Gap Elementary School) provides a good foundation for further small business support by the ATEC.

The ATEC sites are utilized by Families First clients for computer-based job- interest surveys, training in employment-related computer skills (Microsoft Office classes), and access to an online job bank. The computer labs have drawn Families First clients to sites where they spend more time and take advantage of services (educational, employment counseling, etc.) offered beyond the ATEC services. This has been true, for example, for some clients who attend compulsory computer training classes at the Shepherd's Corner in Rogersville. Though the basic computer classes are required for continuation in the

Families First program, many young women have come back (in some cases with their children) for additional ATEC classes or open-lab time. Many of these young women have also benefited from the social services and support that the Of One Accord Ministry has to offer.

Schools have also benefited from having an ATEC center. At the Clinch School, the principal said that parents had spent more time at the school and become more involved in the school community as a result of the center. A strong sense of community has also been supported by ATEC in the Claiborne Adult Learning Center (CALC), where new learners have often been recruited through family connections. We spoke with a participant at the CALC who became interested in taking computer skills classes because of her daughter's experience as an ATEC student at CALC. Now they are taking classes together. It is clear that a strong sense of community has been fostered at the several of the ATEC sites (in some cases encompassing more than one site). Seniors and youth have both benefited from this, but seniors most of all.

Senior citizens seem to be taking fullest advantage of the ATEC sites for informal (as well as formal) technology skill development. Although youth also take advantage of the open-lab times to access email and the Internet, senior citizens are the most likely group to take courses and open-lab times. Director Cathy Wyatt Kitts said that she was surprised at first by the number of seniors who were signing up for classes and using the ATEC services. Seniors, many of whom have computers at home, have acquired basic computer skills and create new social groups through the centers.

Several senior participants we spoke to said they appreciated the slow pace and patience of the ATEC instructors. ATEC staff also said that most adult learners who came in for instruction start out with little or no knowledge of computers. The basic curriculum used by ATEC is at the right level for most adult learners who come in. This curriculum starts with very basic vocabulary and assumes little prior knowledge. The pace of instruction is very slow, with initial lessons devoted to practicing turning the computer on and opening and closing files. One retired man at the Arthur Community Center told us that he had been coming to the lessons and open lab for roughly six months. He said that he was still learning the basics, but hoped to be able to get an introduction to the Internet soon. He very much appreciated the fact that the instructor (John Woods, an instructor with the Claiborne County Schools whose work is supplied to ATEC as an in-

kind contribution) “doesn’t load you up with too many things at once.” This seemed to be a common preference among the older adult learners with whom we spoke. Another senior user of the ATEC site at the Elm Springs Baptist Church Fellowship Hall was able to use the program to support her successful passing of the GED test. When she first came to ATEC, she was tested at roughly a third-grade reading level, but with help from staff in selecting appropriate software (Learning 2000) she was able to advance to a level of literacy needed to pass the GED.

The “Rowdy Bunch,” a group of self-directed learners and ATEC clients, is an excellent example of ATEC adapting its programming to include learner-centered instructional opportunities. The “Rowdy Bunch” began taking computer classes over a year ago at the ATEC center. After they completed all of the classes, they still wanted to continue learning different software programs. In response to their strong interest, ATEC suggested that the members of the group learn different programs of interest and teach them to each other. Now, they meet every Tuesday at the Jubilee Project center to teach different software programs to each other and other participants. They currently have a list of over 100 software programs they intend to learn. The following letter from the “Rowdy Bunch” is indicative of the enthusiasm that older people have shown for the ATEC.

### **ATEC Sneedville Center**

After taking all of the class that ATEC had to offer. A group of ladies wanted to learn more. So Cathy Kitts said teach them more. They gave us advanced Internet, advanced computers, advanced everything. And we still wanted to learn more.

We started buying different CD programs. We bought games, photo, educational, languages, religious, email, travel, home gardening and improvements, medical, and clip arts and others.

Cathy Kitts told us there was no way that her teachers could learn everything that we wanted every week. She suggested that, we learn the programs and teach it to each other. She gave us the time at the center to do this. And when the weather breaks we will take more time at the center.

Now on Tuesday of every week, we come in at four to six. And teach each other one of the CD programs. We have one person learn it and they intern teach it to the rest. If they have trouble with something, they call on one of the others or go to see Lisa or Linda. We have this class on Tuesday for two reasons. One reason is one of the ladies has Tuesdays and Wednesdays off. The second reason is that Lisa Middleton, one of the teachers is there on Tuesday. Lisa wants to learn the programs also, We picked Tuesday so that she would be there to learn along with us.

To this date we have had, 2 classes on Calendar Creator, 2 on Power Album, 3 classes on Wills & Trusts, 2 on Story Book Weaver, 1 class on Barking Cards, 2 on Animated Emails, 1 on the Oregon Trail, 1 on Super Clip Art and 1 on Picture This. In the upcoming months we are planning, AAAmaps & Go, Bird Watching, Growing Roses, 3D garden planning and decorating, Kazoo, Quicken Family Lawyer, and more. We even plan to learn Spanish. We started out with five people coming to the classes. Now we have nine who are regular. Some classes we have had as many as eleven. We welcome them all.

We have bought our CD programs over the Internet, and some from the retail stores. The ones from the Internet are Free, all we pay is the postage, We talk over what we to learn about. Then we each order the same CDs. That way we have the program at home.

Cathy Kitts is not “sit in her office” director. She is very visible in the centers. She encourages not only us, but also others to find things out for themselves. Her office is an open door for everyone who needs to speak to her.

We are very grateful that she allows us to use the center to continues learning more, but as he has said, “that is what the Atec project is all about, helping people to learn.” And we have. Most of us have only had our home computers for little over a year. Thanks to the Atec project we have learned the “how” and “why” of it and a lot more.

Here at the Sneedville Center, we are hoping that the center will be open for a long time to come. That not only grants be given, but it is given a permanent place in the adult educational system.

Thank you:

[signed by eight women and one man]

## Challenges to Effectiveness

Although the main mission of ATEC has been to serve female heads of households, the primary users of ATEC sites appear to be youth and seniors. This may be because youth and seniors have more available time to spend in the centers, and in the case of seniors, better transportation options to reach the centers (many senior users are retired persons who can afford their own cars and may have a computer at home). Childcare and transportation are significant barriers to participation for single mothers. Through its partnership with the Families First program, ATEC does provide training and job search services to many single mothers, but voluntary participation and use of open-lab times by this target group seems to be limited.

Hours of operation and the institutional settings for some of the centers may restrict access for some at the same time it opens access to others. For example, the centers in schools are readily available to students and parents, but keeping centers in schools open outside of school hours is challenging. Centers that are located in church-affiliated sites are readily accessible to members of the churches, but may be unattractive to potential participants who do not share the faith. Having both Methodist and Baptist-affiliated centers in Sneedville was a conscious effort to overcome this problem.

Although the approach seems effective, the bulk of classes offered through ATEC use traditional lecture and drill-and-practice methods of instruction. It was difficult to identify particularly engaging developmentally guided activities for the children or youth who visit the centers. Overall, ATEC programming would benefit from incorporating more opportunities for independent, self-directed engagement in developmentally appropriate activities of interest.

ATEC experiences a number of other challenges, most of which are surmountable or not critical to the overall success of the program. However, solving these problems can improve the services and experiences provided by the centers—both for participants and for staff. One general area to which this applies is technical support. Often, instructors' busy class schedules do not allow time for complicated trouble-shooting if they do not immediately know how to solve the problem. One educator said she spent close to two hours talking to Dell computers to get a solution to a technical problem she encountered.

Contributions from its partners strengthen the possibility for the long-term sustainability of the ATEC community technology centers. In-kind contributions of labor, facilities, and equipment are available to ATEC from numerous sources. However, a source of support for the eight ATEC educators beyond the CTC grants is still uncertain. Finding a way to continue to provide staff for the ATEC sites is seen as crucial to success, yet finding a funding source is not likely to be easy.

## 14. The Lowell Community Technology Consortium

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### **Lowell Telecommunications Corporation, Lowell, MA**

#### **Program Summary and Accomplishments**

The Lowell Community Technology Consortium (LCTC) brings technology access and training to members of low-income communities, including at-risk youth and non-English-speaking individuals in the town of Lowell, MA. The Lowell Telecommunications Corporation, parent agency of the consortium, was originally established to use city funds collected from franchise fees of cable companies to build a community television station. It found, however, that many people were coming to the center for basic technology training. Using its experience in serving non-profits, its expertise in media technologies, and its ability to convene partnerships, the corporation spearheaded the establishment of a new entity, LCTC, designed to support the development of CTCs in the central Lowell area. LCTC's objectives have been to create new and expanded access sites, standardize technical resources, provide curriculum materials, offer technical support, support staff increases and staff development, assist in information exchange, and build a sense of community and mutual support among the growing number of CTCs in Lowell.

The consortium has established a core technology education program, supported staff professional development, increased staffing, standardized technology resources, upgraded hardware and software, provided technical support, and organized the sharing of information and resources across 13 organizations which together operate 17 community technology centers in central Lowell. Founded in 2000, the consortium provides the residents of Lowell with 348 workstations, significantly superseding its goal of providing 200 workstations by its second year of operations. All 13 organizations report that they have developed new materials to meet their constituents' needs and that the quality of their educational programming has improved as a result of participation in the consortium. Over 2,000 individuals have attended 54 different types of classes offered in the consortium's centers, including ESL, computer basics, and high-end multimedia skills training. The centers cumulatively provided over 8,000 open access hours during this

time. In addition to helping members support the equivalent of roughly one full-time staff at each center, the consortium has helped centers secure approximately 600 teaching assistant hours and almost 14,000 volunteer hours for the centers. Nearly 90% of participants in consortium centers report using technology to achieve a personal or community goal since coming to the centers.

Many of LCTC's challenges stem from the diversity of its members—their approaches, and their constituent communities. Some member organizations have difficulties because they have a small physical space, while others have trouble with raising funds, developing curricula, or recruiting, retaining, and training staff. Yet, despite some differences in the challenges they face, the member organizations nonetheless share a common set of basic needs. They furthermore share the recognition that they can accomplish more through collective effort than they would individually. This recognition drives members' commitment to sustaining the consortium, and gives impetus to their on-going efforts to secure additional funding for its continuation.

## Basic Strategies

### *Approach*

The Lowell Community Technology Consortium (LCTC) supports community-based organizations that provide technology access and learning opportunities to the neighborhoods in central Lowell designated as the Lowell Enterprise Community. Sixty percent of the children under the age of five in these neighborhoods live in poverty; in one neighborhood, over 70% of the adult residents have less than a high school education. Most of the needs in this community are similar to those of other economically distressed communities—including literacy and basic education, job training, youth development, and employment opportunities. But the needs associated with the hardships of poverty are magnified for many within Lowell's refugee population, who survived extreme violence in war-torn Southeast Asia before coming to the U.S. One social worker explained that, since the '70s, many of Lowell's immigrants have suffered from post-traumatic stress. This condition can express itself in attention and learning problems, fear of government institutions, social withdrawal, and emotional issues that impact family relationships. She added, "The children grow up not understanding why their parents are different, what

they've gone through. People need help to get through this, and to be able to move along with their new life in the U.S.” These immigrants and their families therefore may need appropriate mental health supports in addition to more typical immigrant services such as ESL classes, life skills training, resources in their native languages, and meaningful ways to connect their educational experiences to their home cultures.

The residents of Lowell have worked hard to address the serious social and economic needs within their community and have met with many successes. Lowell has a very large number of community-based organizations for a city its size, prompting one program director to comment on the “competition” between after-school programs to attract youth participants. Lowell also provides highly specialized services to its immigrant population. For example, the Lowell Telecommunications Corporation—the lead agency for the LCTC—collaborates with the Cambodian Mutual Assistance Association to broadcast the only Cambodian language news program in the United States. For many residents of Lowell, this program provides the only access to news and information in their language. The Lowell Telecommunications Corporations additionally broadcasts cultural programs in six other languages, including Vietnamese, Khmer, Portuguese, and Spanish. Other non-profit entities, many of which are members of the consortium, provide impressive arrays of services as well, from ESL classes for immigrants to life skills training for the homeless, to community action programs for youth.

The Lowell Telecommunications Corporation was originally established to use city funds collected from franchise fees of cable companies to build a community television station in collaboration with local non-profit organizations. In order to train members in digital media, the corporation created a small community technology center in its studio. The organization found over time, though, that many people were coming to the center for basic technology training. Using its experience in serving non-profits, its expertise in media technologies, and its ability to convene partnerships, the corporation spearheaded the establishment of a new entity, LCTC, designed to support the development of CTCs in the central Lowell area. LCTC’s objectives have been to create new and expanded access sites, standardize technical resources, provide curriculum materials, offer technical support, support staff increases and staff development, assist in information exchange, and build a sense of community and mutual support among the growing number of CTCs in

Lowell. To help achieve these goals, LCTC receives support from an array of organizations. Partners include:

- The Center for Family, Work and Community at the University of Massachusetts at Lowell, which provides research background, support, and a forum for local community development organizations. The center is also a member of the consortium, housing a CTC used by social services and local community groups.
- The Corporation for National Service and the University of Massachusetts' Boston's College of Public and Community Service, which together fund six VISTA staff positions.
- PowerUp, which provides hardware, software, and money to build up to twelve youth-oriented computer labs.

In conjunction with its partners, LCTC has been able to improve the capacity of organizations in the city to provide technology access and training for those who need them.

Across the consortium, each of the member non-profit organizations enhances its basic mission by integrating technology services into its core programming. The Lowell Telecommunications Corporation, for example, is able to involve more community groups and individuals in developing public access programming through the digital media training it and other consortium members offer. The LCTC centers associated with the numerous job training programs in central Lowell help prepare participants for jobs requiring technical skills and assist them in applying for jobs using on-line searches, word-processed resumes, e-mailed job applications, and other technological supports.

Participants in ESL classes at St. Julie Asian Center improve their English competencies using Rosetta Stone language-instruction software. As a result, not only are they able to better adapt to contemporary work, education, and social contexts, they are also able to reconnect with their homelands—e.g., keeping track of relatives, friends, and events—affordably and quickly through the Internet. According to many people we spoke with in Lowell, these regained connections are especially important for families slowly rebuilding their lives after the traumas of the Southeast Asian war.

Felicia Sullivan, executive director of LCTC, believes that most important function of the consortium is its ability to serve as a resource for improvements that its members want to make. At the same time, LCTC actively pursues its agenda, building on the consortium members' understandings of their constituents' needs. To accomplish its aims,

LCTC draws on the tremendous community spirit in Lowell that makes its public service organizations enthusiastic about partnering to share resources and reach specific goals. LCTC's core values reflect its commitment to a cooperative approach to serving the community:

- We network and collaborate.
- Everyone can understand and use technology.
- Smooth-running computer labs are essential.
- Technology increases capacity.
- Skilled people are our community's greatest resource.
- Technology gives people a voice.

For their part, LCTC's members reflect a commitment to supporting the consortium itself, with the understanding that it serves to leverage resources across CTCs, making each one of them, the community of central Lowell, and its individual residents more capable as a result. A complete list of LCTC's member organizations is included at the end of this chapter.

### *Programming*

All of LCTC's member organizations offer basic computer access, printers, digital cameras, Internet access, and scanners. There is also a wide range of software at each site, from basic office applications to specialized accessibility software and multimedia applications. The thirteen members of LCTC provide the following types of programming.

- **Basic technology skills training for work**—Most of the organizations provide computer training in specific applications to enhance job-related computer skills. The Caleb Foundation, for example, a nonprofit committed to providing affordable housing to lower-income families, runs night classes for its primarily Spanish-language population. Skills taught include typing, Windows, Word, and Excel.
- **Language and literacy training**—Several member organizations offer English language training as part of their programs. These include the Cambodian Mutual Assistance Association, the Massachusetts Alliance of Portuguese Speakers, and St. Julie's Asian Center.
- **Small-business assistance and economic development**—Some organizations support economic development beyond general workforce training skills. These include

the Lowell Small Business Assistance Center, which offers free professional counseling and information for people who want to start or improve their own businesses. The United Teen Equality Center (UTEC) has plans to start teen-run businesses related to technology—providing services such as networking support and Web design—to offer youth greater employment opportunities and support the needs of small businesses.

- **Youth development and educational enrichment**—UTEC uses technology to engage youth in media production on issues that are important to them, as well as provide them with job skills. The organization hires young people to work on its multimedia production team after school. Teens at UTEC, for example, frustrated with adult-crafted messages directed at youth and challenged by increased violence in their community, produced a public-service announcement to broadcast over a local cable channel. Other CTCs in the consortium have programs with similar features.
- **Adaptive technology**—Life Links, Inc. is an advocacy service that supports people with developmental disabilities. They offer software programs for mentally disabled individuals, and other assistive technologies such as an on-screen keyboard and narration tools. The North Common Center offers wheelchair-accessible workstations with adjustable tables, voice recognition software, on-screen keyboards, and track-ball mouse technology. Recruitment Resources Consulting is developing a training and assessment computer lab at the Massachusetts Rehabilitation Commission to focus on assistive technology and computer access for individuals with special needs.
- **Technology access for interpersonal communication**—All organizations in the LCTC partnerships offer access to Internet technologies that enable participants to use e-mail and chat features for interpersonal communication. However, this specific need is most explicitly met by organizations serving immigrant groups. Member organizations focusing specifically on the needs of immigrants include the Cambodian Mutual Assistance Association, the Massachusetts Alliance of Portuguese Speakers, and St. Julie's Asian Center.
- **Recreational exploration**—Most of the centers in the consortium provide open access time and staff support for free exploration of various applications.
- **Cultural expression**—St. Julie Asian Center, Cambodian Mutual Assistance Association, and the Massachusetts Alliance of Portuguese Speakers all offer computer access and training to better facilitate cultural pride and expression. At St. Julie's Asian Center, participants access Cambodian language Web sites for news, for example. They also participate in Cambodian-language chats and access Cambodian music. A few participants have developed their own Web sites.

## Success of Implementation

LCTC's success has stemmed in part from the commitment of individual members of the consortium. Before LCTC was funded, members of the consortium met to develop a

strategy for mutually support in providing better technology access and training. Even though they were not awarded a Department of Education grant the first year they applied, they stayed together to continue planning and seek corporate, foundation, and federal support. Felicia Sullivan, Executive Director of the Consortium, says that the level of member's commitment stems from their deeply felt understanding of the needs of people in Lowell and their recognition of the importance of the consortium in serving these needs.

Several aspects of LCTC's support services have been key in enabling members to integrate technology to better develop their organizational capacity. The standardization of equipment and networks has dramatically improved the functioning of members' CTCs. LCTC has helped centers design and set up their labs, provided on-site technical support, and trained center staff in efficient methods of maintaining equipment, such as restoring hard drives. In some cases, LCTC has insisted on a member's improving its services by obtaining high-speed Internet connections or digital cameras. Early on, LCTC established procedures for working with centers to develop mutual understanding about the consortium's role in technical support. Although now technology at all the centers runs smoothly, according to one staff member, "the first year was a big technical course"—the technology support person for the consortium traveled from center to center teaching staff how to troubleshoot basic problems. In the second year of the program, many staffers became MCSE or A+ certified to be able to take on larger technical support responsibilities. In addition to the capacity they have themselves developed, several centers now also have on-site Vista volunteers to help with technological issues as well. In some instances, staff at the CTCs have been able to apply their technical support skills to help their parent organizations, too.

Beyond helping them develop their technology support skills, LCTC has worked with staff on other aspects of their professional development. Most important among these is the capacity of staff to improve the teaching and learning environment at their centers. Improving the range and depth of staff members' technological fluency is a fundamental part of this process. To this end, the Lowell Telecommunications Corporation offers intermediate and advanced digital media training to consortium members. The corporation has also helped all member organizations start a Web site and a Web-development training program for participants in their programs. LCTC itself provides

member staff with an extensive listing of professional development resources and encourages staff to take courses offered in the Lowell area. LCTC also provides member organizations with assessment tools and program curricula, strongly recommends that centers take a project-based learning approach whenever possible, and guides them in how to do so. Through its newsletter and its monthly meetings, LCTC helps its member organizations plan for sustainability—covering topics that range from managing technical growth to seeking future funding.

Felicia Sullivan, director of LCTC, facilitates monthly meetings, prepares the minutes, and posts them on the Web. At one recent meeting, the topic was Spanish-language services. At another, members discussed mechanisms for sharing curricula so that they could avoid duplicating efforts. Members often take up the subject of how they can integrate more project-based activities in their programming, and how they can better make programming relevant to the lives of those in the community. In general, monthly meetings provide valuable peer-to-peer professional development, as key staff in member organizations gather to discuss challenges, opportunities, technical issues, research findings, curricula, and other topics of shared interest.

In addition to providing a forum for sharing information, their collaborative efforts generate other kinds of value and support for consortium members. For instance, six VISTA volunteers—supported by the Corporation for National Service through the University of Massachusetts, Boston—spent a year at the centers providing technical and instructional support. Volunteers from the computer science department at the University of Massachusetts at Lowell have provided training for LCTC staff. Within the consortium, members share resources, such as a mobile computer lab the group created, or focus on the problems of a subset of the membership, such as the particular needs of Southeast Asian immigrants, seniors, or disabled individuals. During our site visit, we often heard mention that LCTC's member organizations are committed not only to gaining technology and support for their own programs, but are committed to the consortium as a whole for the sake of the people of Lowell.

Developing strong technology programming has transformed many of the general characteristics of the services provided by the LCTC's members. St. Julie's Asian Center illustrates one case of how this change has taken place. Prior to the establishment of the CTC, many immigrants in the community who had strong interest in developing

technology skills had no means to do so. Although some adults in the community have purchased home computers to help their children with school, they do not themselves know how to use the computers. For immigrant women, in particular, who work long hours and have enormous family responsibilities, spending time “playing” on the computer is not seen as important. However, the women’s families approve of their attending school to improve their earning capability: facility with English and computers are recognized in the Southeast Asian community as a way to improve job opportunities. Having a socially legitimated means—attending regularly scheduled classes—seems to be a necessary condition for these women to learn about technology.

Yet many of the participants who come to St. Julie’s to learn technology exhibit an apprehension about computers. Instructor Tim O’Connor says that by pairing technology training with English instruction, the center uses a “backdoor” approach to teaching technology skills to students who feel intimidated by the prospect of working with computers. Participants in the St. Julie’s language program are introduced to basic keyboarding and mouse skills while using the Rosetta Stone software. When they become more comfortable with these skills and the Windows environment, they can interact with more experienced peers in the lab using computers for e-mail or Web-based news. At the same time, O’Connor assigns Cambodian or English language-learning activities which further engage them in using computers. Eventually, many participants begin attending open lab time on Friday to explore using the computer for their own interests. When this happens, they are usually ready to enroll in O’Connor’s basic computing classes, having developed a sufficient level of comfort with computers and the instructor to overcome their initial apprehension. One participant at St. Julie’s indicated that she would not have tried to learn computer skills if they had not been presented as part of a language program. She commented during our visit that “using the operating system” was for her a part of learning English and learning to function in the United States.

O’Connor’s approach, which helps ease participants into range of computer use, works well in part because of his carefully developed relationship with the students. O’Connor continuously attends to them, assessing their skills and finding opportunities to integrate new steps in their technology learning into the activities in which they are interested. Many students in the class have learned, for example, how to take and send

digital photographs of their life in Lowell back to Cambodia. As the classes proceed, O'Connor writes or modifies curricula to meet participants needs, developing a novel activity or writing up a new tutorial when it is needed. In addition to developing programming that is culturally relevant and meaningful to the participants, O'Connor also supports them in going at their own pace. He has adapted much of the curriculum to accommodate his participants' reading level and language skills. A number of participants have taken his basic courses several times, trusting him to be patient and to want to help them. Participants also draw on one another's knowledge, encouraged to do so by O'Connor because he recognizes that he does not always understand the life issues participants bring with them to the lab. Overall, O'Connor shapes his courses to create a learning environment that meets students where they are and encourages them to develop their own interests using peers, a variety of technological tools, and his teaching skills as resources.

O'Connor's skills—like those of staff at several of the other CTCs we visited—serve the needs of participants beyond the walls of the center, too. In addition to helping participants overcome their fears of technology, O'Connor has won their deep trust, and he spends a great deal of his personal time going to the homes of participants to help them troubleshoot technical problems or accomplish particular goals using their own computers. O'Connor also lends lab equipment, such as digital cameras, when some participants need them. He explains that he does these things because he can see how Internet technology gives immigrants access to resources that can change their lives—through reconnecting with family in Cambodia or to being able to stay up with events in Southeast Asia. He is moved by the tremendous obstacles Cambodian refugees have overcome and wants to do what he can to help them take their next steps towards building better lives in the U.S.

St. Julie's physical location alone is a major help to participants trying to overcome obstacles to better integration into American life. The center is housed in an old Catholic church on a street corner right in the neighborhood it serves; almost all participants can walk there from their homes. Before the center opened its CTC, neighborhood residents encountered transportation, language, and other barriers trying to access technology. One of the regular users of the center had previously tried to take English language classes at a local school but ran into repeated obstacles. Not only did she have to drive there, but she could not read the signs for where to park. Several times she wound up parking in illegal

spaces and incurring expensive tickets. She describes being too shy to ask for help, or even to respond when people approached her to offer assistance. She commented that after receiving many tickets, she could no longer afford to risk attending the program. Now she, and many like her, have a center that truly meets their needs for technology access and learning.

The United Teen Equality Center (UTEC) has a mission very different from St. Julie's Asian Center, but it similarly is able to accomplish its goals because of support from LCTC. UTEC programs involve some of the most "at risk" youth in Lowell. The center provides one of the only places in Lowell especially for teens, and offers a safe alternative to spending their days on the streets. It has a unique development approach: the youths themselves participate in designing programs, managing the finances, handling discipline problems, and hiring staff. The center's distinctive approach makes it a "cool" place for even the most alienated youth to hang out.

Executive Director Gregg Croteau encourages the lively atmosphere at UTEC. During our visit, Croteau, who speaks Vietnamese fluently, spent much of his time answering his pager and talking on a cell phone to the many street outreach workers who hang out in downtown Lowell to encourage youth to come to the center. Croteau tells us that given a respectful, empowering environment in which to grow, youth can be a powerful positive force in the Lowell community. With this in mind, staff at UTEC have developed a careful balance of structured programs for youth, mentoring relationships, and informal peer-to-peer learning opportunities throughout their programs, including technology learning opportunities. For example, unstructured access to Internet technology is an important entry-point for technology learning. While many participants start out playing games or chatting online with friends, most become intrigued by other uses of technology after seeing videos produced by the teen video program or Web pages designed by their peers. There are also many opportunities for youth to grow into positions of responsibility as their technical skills and interests grow. David, a young man interested in computer technology but without a lot of experience or training, became first the de facto lab manager after spending almost all his time at the center. Staff recognized his high level of interest, and he later started working the position as a paid job. He now spends his time in the lab helping others learn about specific technologies as

he builds his own skills. Similarly, members of the video team have the opportunity to become TA's for subsequent classes.

UTEC offers multiple opportunities for youth interested in learning higher-end technology skills. Programs range from digital media and music authoring, networking and PC repair, Web design and graphic design. The ability of participants to access advanced levels of technology is especially important given the lack of technology-related coursework activities in Lowell's schools. Even in schools with well-functioning labs, teachers find it difficult to integrate technology into the curriculum given their lack of training and time. Furthermore, few teachers are able to help youth engage in extended projects that give them the training in advance technology skills or project management necessary to enter the job market at a higher level, or to be able to design, develop, and manage projects on their own. Several youth organizations in the city have indicated a need for opportunities for youth to use media as a tool for self or community expression to build confidence and self-esteem as well as technical skills.

While it is not the only high-end training site in Lowell, UTEC offers media production experience unavailable elsewhere for teens in the city. Teens are often intimidated by the prospect of taking classes alongside adults and outside of their familiar environments. They will, however, often take advantage of community resources when provided with a little support. Recognizing this, UTEC leaders designed its media program to take advantage of Lowell Telecommunication Corporation's resources and to introduce teens to its learning environment in an appropriately supportive format. UTEC's media production team currently focuses on video production. In the video group, the teens participate in media training offered at the Lowell Telecommunication Corporation lab. They then return to UTEC to work together as a group to make a public service announcement about an issue they decide is important. Youth are involved in all aspects of production around the project, including project management, acting, editing, camera work, assessment and distribution. Projects focus on youths' developing a strong sense of the process of making a video as well details surrounding technical issues in production.

The group is led and coordinated by Laki Vazakas, Multimedia Technology Coordinator and documentary filmmaker. Vazakas manages the team, is available to keep things moving on track, and consults on content, design, and technical issues. While the

group maintains a casual atmosphere, Vazakas stresses the importance of work habits and responsibility. Youth are paid for their work, and so are accountable for quality and timeliness. So far, the group has produced two videos; a public service announcement dealing with issues of teen violence that is broadcast frequently on a public access channel, and a video about UTEC's programs which is often shown at UTEC events and fundraisers. While none of the young people had any media experience previously, many of the teens in the group now express career goals related to media production or acting.

An important aspect of UTEC's programs is the development of leadership skills and the promotion of a positive youth culture and community. Its media production projects have played a key role in generating the spirit of UTEC within the organization and publicizing this spirit within the general community. The video group's production called "UTEC Culture" highlights all of UTEC's cultural arts programming (i.e., culinary arts, house dancing, break dancing, capoeira, music recording, and video production). The group is currently working on a hip-hop talk show to air on the public-access cable channel. During the next quarter, the participants will work as teaching assistants for a 12-week video workshop. By using public access television as a forum to give youth voices a wider audience, UTEC is able to assert influence on youth beyond its walls. When asked why he became interested in media, one young man described how great it felt when his friends at school told him they like his video. "When you make something that looks professional and everyone says, 'hey how'd you do that!' it's kinda cool. Like they didn't expect we could do it." He and the rest of the production team felt the video had an impact on Lowell's teens.

While UTEC uses project-based learning to promote youth voices and culture, other organizations in LCTC use project-based learning to connect youth to their traditional cultures. For example, Cheryl West of the University of Massachusetts' Center for Family, Work and Community runs an after-school aquaculture project called "Project Splash." It is run in collaboration with Rogers Middle School and an LCTC partner, Recruitment Resources Consulting, at Lowell Housing Authority's Mercier and Flanagan Centers. Working together, the organizations have created a means for students to learn while addressing an important social, economic and health issue in Greater Lowell. Many people in Lowell's large Southeast Asian community rely on fish as a main source of protein, as did their families before coming to the United States. However, the fish in the

Merrimac River in Lowell are toxic due to decades of industrial pollution. Families nonetheless continue to fish the river to provide the traditional (and free) source of protein for their families. Cheryl West saw a solution to the problem in developing aquaculture, the cultivation of fish farms.

Fish farming is a longstanding tradition in Southeast Asia, but is relatively new to the United States. West hopes that by learning fish-farming practices, youth will be able to gain a deeper knowledge of Southeast Asian cultures, learn science concepts, better understand environmental issues, and participate in projects that are meaningful to the community. Involving more than 100 of Lowell's youth, largely from immigrant backgrounds, the project relies on technological resources at the CTCs to track fish growth and breeding. Based on data they collect at two fish-farm sites—one at Lowell Housing Authority and the other at the school—youth participants create Excel graphs and charts to assess the status of the stock and recommend adjustments. They also maintain a Web site that tells the community about the project and creates a record of their collectively gained understanding. Through promoting the use of technology in authentic, meaningful projects, West hopes youth participants will be better able to learn technical skills and integrate technology into their lives.

West comments that one of the most interesting things about the project has been the connection that has grown between the CTC and the neighborhood school. Because of curriculum requirements and limited time, the school provides children with few opportunities for project-based activities. By basing the project in the CTCs rather than in the school, West has been able to engage students in activities that connect the science of fish farming to cultural traditions of food production, preparation, and consumption. She reports that youths in the after-school program brought in examples of their spreadsheets and Web site to their classroom teacher, who was surprised to see the extent of their work. Paradoxically, because the project is run primarily out of the CTCs, West has been able to help the classroom teacher better integrate technology into the project within her classroom. At the same time, the project receives legitimacy because of the school's involvement; youth participants expressed positive feelings about seeing their culture represented in a scientific context in school. West feels that Project Splash has been important in better integrating the school into the community, and also in supporting teachers' own professional development.

## Challenges to Effectiveness

LCTC faces a number of challenges in implementing its technology learning programs. As is often the case, many of the challenges stem from the organization's greatest strength: the diversity of its members, their approaches, and their constituent communities. Some member organizations, such as UTEC, have difficulties because they have a small physical space. Others have trouble with raising funds, developing curricula, or recruiting, retaining, and training staff. While they share some common experiences, each organization looks to the consortium for different types of support. What holds the consortium together is its members' commitment to the people of Lowell and to each other's organizational growth and development. Each member organization realizes the key to sustainability is their collective effort.

One of the unique features of LCTC's mission statement is its emphasis on project-based learning and community-relevant content. However, getting this approach implemented at all centers has been challenging for LCTC's leadership. While member organizations all agree philosophically on the importance of project-based instruction and community content, there are varying degrees of buy-in during actual program implementation. For some organizations, such as UTEC, this approach clearly fits with its philosophical approach and everyday practice. For other organizations, such as St. Julie's Asian Center, a project-based pedagogical approach fits some programs but not others. Students produce a newsletter, and some are producing their own Web pages, but the primary purpose of the lab is to support English language learning. Still other organizations, such as New Beginnings, which operates on a tutorial model, do not see project-based learning as fitting to their programs at all.

Leaders of LCTC see centers becoming more aligned with the LCTC agenda over time. Felicia Sullivan believes the important thing is that member organizations have a resource to turn to with questions about implementing project-based learning or starting media programs at their centers. LCTC does not insist that member organizations comply with requirements; rather, Sullivan and other champions of project-based learning use more subtle approaches to influence pedagogical practices. Sullivan has made sure that the necessary tools, such as digital cameras, scanners, etc. are available at every center, and made sure that issues surrounding community-based content and projects stay near the

forefront of discussions at consortium meetings. In one instance, when offered a digital camera as part of their equipment, St. Julie's Asian Center's program director explained, "We don't need that." Sullivan encouraged her to take it anyway, and it proved invaluable for the newsletter and the computer class. When we visited St. Julie's lab, instructor Tim O'Connor was completing a PowerPoint slide presentation of photos they had taken on an excursion to the Boston Aquarium the previous day. One of the participants describes how she often borrowed the digital camera to take home so that she could take pictures of her family and send them to Cambodia by e-mail.

Another challenge LCTC faces is developing a model for technical support and professional development. The consortium offers MCSE training and A+ certification to encourage each organization to support its own networks and equipment. Some center staff have indicated that they learn best from having LCTC's technical support person come by when needed to show them how to fix the problem. Other staffers, such as Tim O'Connor at St. Julie's, have indicated that having access to professional training was a major incentive for him to take the job because of the greater number of career options that certification provides. Debate continues: Are the skills addressed in professional certification programs well matched to the needs of CTCs? How much does a staff person need to know to maintain a community computer lab? What are best practices in technical support for community computing? Overall, LCTC has found that a key feature in minimizing the cost of technical support has been standardization of software configurations and equipment. A key feature in sustainability has been decentralization of skills so that centers do not have to rely on one person to fix all of the problems.

Obviously, running an effective network of many community-based organizations engaged in community technologies is an expensive endeavor. LCTC has been able to accomplish as much as it has only because of funding provided by the Department of Education grant. While the consortium has stable funding, it is insufficient to support the wide-reaching program LCTC has developed. Lowell Telecommunications Corporation, LCTC's founding organization, continues to play a key role in leveraging resources for special projects run by other consortium members. But it has run into some difficulty funding its own technology programs. The structured youth and senior programs it had offered previously in its CTC no longer receive outside funding, and the staff person running these programs has left the organization. George Preston, executive director of

the organization, comments that they have not been able to replace departing staff because they lack the guaranteed funding necessary to support new hires. Unfortunately, one of the staff members who left was the technical support person for the consortium. UTEC was able to hire this person for its own technical support, but this still left the overall consortium without assistance. Lack of secure funding threatens the consortium's ability to continue to support its member organizations with technical support, professional development, and organizational capacity-building.

## Lowell Community Technology Center's Member Organizations

LCTC's 13 member organizations each have a particular focus to their technology programming. A brief description of each one follows.

- **Lowell Telecommunications Corporation**—Lowell Telecommunications Corporation is a community media center serving the diverse population of the city. The organization incorporates media and technology literacy into all of its training programs, which are offered on a quarterly basis. The public access lab provides over 55 hours a week of public access time. A second lab both is a digital media training site and is actively used as a digital media production lab. The organization is also the main coordinating agent for the consortium and assists in the programmatic and technical support for the project.
- **St. Julie Asian Center**—The St. Julie Asian Center is located in the area with the highest population of Southeast Asian immigrants in the city. The center offers computer-supported English language training and basic computer classes to Southeast Asian immigrants.
- **Massachusetts Alliance of Portuguese Speakers (MAPS)**—MAPS Community Technology Center, located in a densely populated Portuguese-speaking neighborhood, is open to all adult Portuguese speakers. Participants range in age from 19 years to senior citizens. The center offers basic computer literacy classes and the lab is open to anyone in need of computer use during work hours.
- **Cambodian Mutual Assistance Association (CMAA)**—The CMAA offers basic computer literacy classes, GED classes, and job-searching courses that include instruction in resume- and cover-letter writing and how to use Internet resources. Using e-mail to communicate with potential employers and colleagues is also part of the curriculum.
- **YWCA**—The YWCA of Lowell has community technology centers located in its two neighborhood youth centers – the Acre Youth Center and the Lower Belvidere Youth Center. The centers serve mostly children and teens, but many adults, including seniors, participate in the programs as well. “Surfing Seniors” is an intergenerational project that links teen mentors to senior citizens who are learning basic computer skills. Teens work in one-on-one tutorials with the

seniors to help them develop basic skills and then apply the skills to activities of their interest. The labs offer several project-based learning programs focused on Web design and newsletter production. For example, in the Health Challenge Program, students create Web-based movies about making healthy lifestyle choices. The Lower Belvidere center also offers a program that trains youths in PC support and network administration.

- **Girls, Inc.**—This center provides after-school activities for girls ages 6-18, including computer classes and daily open access to the computer lab. Project-based courses include web page design and newsletter production. The center also focuses on homework help and support, and teaches participants how to productively and safely use the Internet for research and fun.
- **United Teen Equality Center (UTEC)**—The UTEC Multimedia Technology Center offers video and design classes to teens, and open access hours and basic computer classes. Because approximately one-third of UTEC's active teen members have dropped out of high school, the center emphasizes project-based learning activities that develop both academic and job-related skills. For example, the center offers a Youth Mapping Group, in which teens learn social science research techniques and Web design in order to present research about their community on a Web site.
- **The Caleb Group**—This CTC offers programming to participants of all ages, with courses designed in response to participants' requests. Young children use the center to play educational games after school in a safe environment. Youths mostly use the center for school projects, digital imaging, and Internet access. They also use the center for homework help and Massachusetts Comprehensive Assessment System preparation. Adults primarily use the center for developing job-related skills.
- **Recruitment Resources Consulting (RRC)**—RRC operates three CTCs in housing and community centers in the city. These centers offer after-school programs, open access, and workforce development training. In addition, the CTC run by RRC at the Massachusetts Rehabilitation Commission provides job support to individuals with disabilities and is developing a wide range of assistive technology resources. RRC has developed a 20-certificate program called "Computing for the Workplace" and runs a computer recycling and distribution program. RRC is also working with the Lowell Housing Authority to create an additional five labs to serve elderly residents.
- **Center for Family, Work & Community**—The Center for Family, Work and Community is one of the community outreach arms of University of Massachusetts at Lowell. The center has longstanding alliances with many of the area's ethnic, neighborhood, and non-profit organizations. The center also operates a new CTC that draws on the university's resources for project-based technology programs. The center provides open-access hours, basic computer training, and media production classes. It also works with non-profit organizations to help them use the Internet to research grant opportunities and develop mass mailing capabilities.

- **Pathfinder/Lowell Transitional Living Center**—Both these programs serve Lowell’s homeless. Pathfinder uses technology to support its Adult Basic Education program, which includes GED and other courses for individuals who are not able to participate in mainstream classes. In addition to technology courses, the program offers access to a wide range of homeless services. Open-access hours are staffed by VISTA volunteers who provide one-on-one support to participants. The Lowell Transitional Living Center also offers GED classes and open-access programming. The center is developing courses for intermediate and advanced technology users, and also offers a digital art class and a display forum for participants’ art.
- **Lowell Community Charter School**—The CTC at the 300-student Lowell Community Charter School supports the school’s goal of preparing children for high academic achievement by providing technology access and training to students, staff, and the community. Student activities at the CTC are project-based and aligned with classroom activities. The center also offers many educational software titles, and administers reading comprehension tests via computer using the Scholastic Reading Index.

## 15. Cross-Case Analysis, Policy Implications, and Future Research Directions

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In this chapter of the report, we present a cross-case analysis of data collected from the twelve sites we visited and discuss possible policy and research implications of our findings. Our cross-case analysis is based on a systematic review of common data elements from interviews and field notes that were captured on a standardized debriefing form used by our case study researchers. In our analysis, we identified factors that were associated with greater participation and improved learning outcomes among the particular centers we visited. Our coding team examined the data in view of a set of hypotheses and rival hypotheses (see Appendix C), and in the process, we identified a set of key implementation differences that were associated with different degrees of overall program success. Specifically, we found significant ways that the twelve centers we visited varied in their accessibility, staffing, program offerings, or sustainability.

Cross-case analyses such as these must be interpreted with caution. Identification of general principles requires different research methods, including observation and experiment. We therefore limit our conclusions to the particular sites we visited; we cannot infer from this analysis general principles of “best practices” from the centers studied. Still, because we sampled a range of centers in our study, our cross-case analyses can point to challenges that may be important to a wide range of community technology centers. In addition, factors associated by staff members and participants with successful programming at centers can be used as the basis for hypotheses to be tested in future research. It is important not to dismiss these perspectives in this case as ungrounded theory. Many staff, especially, employ (explicitly or implicitly) educational research findings in the course of designing programs; moreover, no theory currently exists about learning in community technology centers that has been empirically tested. The field is a hybrid one, drawing from different disciplines, and it is a relatively new one, with little research on best practices.

With these caveats in mind, we have found evidence that four key factors were requisite for supporting positive learning outcomes for participants at the sites we visited. For our twelve sites, these factors were:

- Successfully confronting the complex and interrelated *access* issues facing their participants.
- Responding *flexibly* to provide participants with learning experiences that match their capabilities, needs, and authentic interests.
- Providing instruction by *committed* individuals who deeply understand the communities they are serving and “grow with” participants.
- *Sharing* programming, technical, and informational resources among centers in a region.

After a discussion of these factors, we addressed the policy implications of our findings, and proposed several possible studies that could build on our qualitative analysis to further test the propositions we put forward.

## Successfully Confronting *Access* Issues

Access to technology resources has an obvious and direct relationship to the learning outcomes of participants who use federally funded CTCs: without the technological tools provided by these centers, most residents would have little if any opportunity to learn how to use technology or to use technology for other educational objectives (e.g., supplemental reading instruction for reading for children; ESL instruction for adults). The authorizing language for the U.S. Department of Education’s Community Technology Centers program foregrounds providing technology access in regions and communities where people are least likely to have access to computers and the Internet at home. The goal is to:

...to increase access to technology and promote the use of technology in education through the development of model programs that demonstrate the educational effectiveness of technology in urban and rural areas and economically distressed communities. (Federal Register, 1999, p. 22954)

The subsequently authorized Government Performance and Results Act (GPRA) indicators for the program also identify access as a fundamental objective.<sup>1</sup>

Even when technological resources are publicly available, however, their mere existence does not make them accessible to many users at the times and in the ways that they need. The issue of access itself, though seemingly straightforward, is complicated by many factors that range from the most practical considerations to ones which are educational and even psychological or sociological in character (Lenz et al., 2000). When we take this broader range of access issues into account, we see that the CTCs we visited have worked to overcome barriers to access on multiple fronts, making it possible for them to fill special niches within the communities they serve. When the CTCs we visited failed to overcome barriers to access—i.e., failed to create circumstances that facilitate and encourage use for the populations that most need their services—they also were at risk of failing to generate a user base that could support and justify their operations.

At the twelve centers we visited, the quality of the programming, the attitudes of the teaching staff, and the sense of acceptance that participants feel at the center all shaped the degree to which centers were truly “accessible” to participants. The centers that successfully addressed access issues took into account the many factors that attract people to a center, provide them with the means to get there, draw them into learning activities, and make continued participation valuable and enjoyable. In this section, we explore these different dimensions of access and discuss how they related to centers’ success as viewed by staff and participants, as well as our research team. Summed up, the access issues that most significantly affected the twelve centers in our study were:

- Location: transportation, visibility, safety, and ease of access. Inclusivity: Openness to different ages, ethnicities, religions, languages, educational backgrounds, and communities.

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<sup>1</sup>The goals and objectives for the two sets of recently approved GPRA indicators are as follows:

1) Goal: Provide access to computers and Internet services to adults and children in economically distressed urban and rural communities. Objective: To increase the number of new and expanded access points (locations) which provide opportunities for individuals to become computer literate and to use the Internet.

2) Goal: Support learning outcomes for adults and children in economically distressed urban and rural communities. Objective: To increase the number of children receiving supplementary educational opportunities and the number of adults improving their basic education, English language proficiency skills and earning a high school credential through the use of technology.

- Programming and Support: flexible offerings and staff support to meet community-specific needs, interests, and skills.
- Outreach/Attracting target population: marketing and “getting the word out.”
- Technology: having a range of high-functioning hardware and software to address specific needs.
- Low Cost: the value to participants of having services offered for free.

### *Location*

Of the twelve grantees we studied, seven of them operated or supported centers in locations that are well situated to meet the needs of their target participants. These centers typically were located near to their target population, were close to other businesses or services already frequented by this population, were readily reached via public transportation, were easy for potential participants to find, and did not pose any particular safety problems for people using the center, especially at night. In cases where participants needed to drive to the centers, the centers also offered adequate parking. A particularly important way for grantees to meet the needs of multiple groups of clients, we found, was by operating several smaller centers that were strategically located for serving particular groups. Centers that were situated in housing complexes often met all the locational needs for their participants. Several of the school settings that we studied were well situated, also.

Of the five sites we visited that reported problems posed by their locations, one of these had effectively solved its problem—namely, that the large geographic areas it served made it difficult for some residents to get to the site—by enlisting extra assistance from local faith-based groups. Another center we studied was located in a space not readily visible—and therefore not well known—by some segments of its target populations. But because this center successfully recruited participants from among groups that were already familiar with the building where the center was housed, this center was well attended and provided programs of great interest and value to its participants.

Evaluated in terms of how well their location affords basic access, 3 centers out of the 29 total in our study (one each among the centers operated by the remaining three grantees we studied) could not be accessed readily because of transportation problems, because they were not in sufficiently safe neighborhoods, or because they were difficult to find due to inadequate signage. In all three of these cases, according to staff members and

participants we interviewed, attendance at the centers had been affected by these locational problems. The center with poor visibility was in the process of adding well placed signage to attract more participants, but the problems presented by the location of the other two centers did not have easy solutions.

### *Inclusivity*

A second key factor requisite to the successful functioning of the CTCs we visited was inclusivity—that is, the sense of welcome or belonging that potential participants experienced, regardless of their background. For the most part, all twelve of the grantees had created centers where persons of different backgrounds mingled freely and comfortably. Participants at these centers represented a diversity of ethnic and linguistic backgrounds, of ages, of physical abilities, of employment status, of educational achievement, of technical skills, of religious affiliation, and, in some cases, of relative socio-economic status (i.e., homeless and homeowners). While all twelve grantees operated one or more centers that served a diversity of participants, four grantees also operated centers that—in actual practice—attracted participants primarily of particular ethnic or religious groups because of their location in an ethnic neighborhood, or in a community center, church, or social service agency that traditionally had been serving people of a particular background. In each of these cases, grantees operated other centers that were situated to attract participants of other backgrounds. Only in one case was a center that had been intended to serve a more diverse constituency reaching too narrow of target audience. At this center, new signage and outreach were being implemented to overcome this problem.

Centers differed in their ability to give centers a ‘local’ character that made centers seem like comfortable, familiar places—yet another dimension of what was meant by the accessibility of centers. On the one hand, at all of the sites we visited, participants told us that they felt comfortable at the center not only because it served people from their own community, but also because it was close to home or in an otherwise familiar setting, and because the atmosphere was not intimidating. At five sites, participants specifically mentioned unsuccessfully trying to attend technology classes at a community college or more formal educational setting but feeling out of place there. On the other hand,

however, three of the seven school-based centers reported challenges to making potential participants feel comfortable in school-based sites.

For example, at one site staff, postulated that some members of the local community might avoid the CTC because they felt uneasy about attending activities at the school. At two other school-based centers, staff noted that at times they found it problematic that they could not accommodate adults during the school day. At one of these centers, no childcare could be provided on campus, so adults wishing to use the CTC after school hours needed to find alternative arrangements for their small children. Despite these difficulties, however, staff at school-based CTCs and participants themselves said that schools were a natural and sensible place to house CTCs because of their ready accessibility and the mutually positive influences the school and CTC have on one another.

In two instances we observed, centers experienced challenges in successfully integrating their diverse participants into particular courses taught at the centers. In one of these cases, instructors reported problems with the pace at which seniors in a course were progressing; younger students generally wanted the course to move faster. At three other centers, we observed that staff created specialized times for providing extra support for seniors. (It is worth noting that seniors at one center moved considerably faster than other participants and required special attention because of their accelerated speed.) Still, despite the many demographic lines along which peoples' needs and interests ran, the CTCs we studied drew people together in the common pursuit of practical goals. For many, CTCs had become a key social focus of their lives, giving them a space in which they could get to know others, establish a shared identity, and build a feeling of community. At six of the sites we visited, for example, active communities of seniors had developed; at all but a few of the individual centers, supportive peer groups among youth had formed. Typically, the members of these groups become one another's teachers in informal programs of peer-to-peer instruction.

### ***Programming and Support***

An element of providing access at the sites we observed was providing appropriate programming and support from staff to attract and retain participants. Staff at several centers described their view that participation was the key ingredient of access, and that

participants would only use services that met their needs. Before opening, all twelve case-study centers used community surveys, informal interviews with neighborhood residents, or economic planning data to decide what type of programming to provide. As participants came to the centers and made their needs known, each of the sites in our study modified their programming and educational approach to meet them. The initial surveys that centers conducted when preparing to open their doors, therefore, were only the beginning of the process through which center staff learned from participants what types of programs would best suit the latter's needs.

Being responsive to the needs of users was perhaps the single most important strategy centers used to build and sustain vibrant learning environments. Across sites, staffers during our visits spoke of the voluntary nature of CTC participation and the importance of providing valuable and meaningful programming to create and sustain interest. At four sites we visited, staff had developed combined technology/ESL classes in response to participant interests. At other sites, we observed staff responding to participants varied needs in different ways. Although not all centers were as flexible and multifaceted in their responsiveness to participants, little of the programming used at centers came prepackaged, and staff continually helped participants attain their own learning goals. We found different degrees of this kind of responsiveness at all twelve sites we visited.

Appropriate scheduling was important for meeting participants' needs at the twelve sites, too. Most of the centers offered courses and open access hours at times that suited targeted populations, but a few centers had difficulties with this. One CTC did not have staff for the morning hours, for example, when many seniors might have visited the center. Another center faced a problem resulting from many of the adults in the community working two jobs or extremely long hours; there was little or no time for these people to use the CTCs. In addition to potential participants being too busy, sometimes the CTCs themselves were too busy. At four of the sites we visited, access was limited because of high demand.

### ***Active Strategies for Reaching Targeted Communities***

Although two centers we visited encountered no difficulty attracting large numbers of participants, the rest of the grantees put forth some effort to ensure that members of their target communities were informed about the CTC and its offerings. Fliers, special

publicity events, and inter-agency referrals, among other strategies, were used by several centers; other centers attracted larger number of participants only after previous participants had spread word about the quality of the programming. Although some centers we visited had high levels of attendance overall, they had insufficiently drawn in members of certain target populations, despite their efforts to do so. This was notably the case for two of the centers we observed.

Two other centers in our study had high levels of participation, but most people in their target populations did not know of them because the centers had conducted insufficient outreach. While these centers served many people, operating almost always at full capacity, they did not necessarily serve the people who needed them most, since relatively few in the community-at-large knew of their services. Only in three instances during our case studies did we observe low levels of attendance at a center, but it was not clear to what extent this was attributable to poor outreach.

### ***Technical Resources***

Across sites, participants stated that their CTCs provided the best and often the only technology resources available to them in their communities. These centers provided the target community's best or only readily accessible and functioning access point with sufficient supports for participants to learn how to use technology; there were not "competing CTCs" serving the same purposes in the local area. Therefore, participants relied on these CTCs for being able to use technology.

Although almost every center we visited provided participants with recent-model computers and high-speed Internet access, there was some variability across centers in the technical resources to which they provided access. Because of their cost effectiveness, two centers had recently introduced hand-held technology into its program offerings at the time of our visit. Handheld tools were used to teach time management, keyboarding, digital camera usage, and use of the Internet. Two other centers offered portable computing and learning devices that participants could borrow to use at home. Another grantee offered state-of-the-art videoconferencing equipment at its three centers to support the local communities' needs for access to college registration and courses. Several centers offered specialized software for graphic design or media development. Three centers offered assistive technologies, one of these setting a standard in its region for

showing casing and allowing public access to advanced assistive technologies. As in the case of programming, the technology that centers provided was most useful when it was tailored to fit participants' needs.

### ***Free Services Ensure Greater Use***

The success of the CTCs we visited undoubtedly relied largely on the fact that center resources and services, with minor exceptions, were provided for free. (Two centers we visited had experimented, unsuccessfully, with requiring a small deposit, returnable upon completion of the course, to motivate attendance.) At several centers participants mentioned that they were able to attend classes because they were offered for free. Although we did not prompt for this in our interviews with participants, it was likely that at all the centers' participants would have indicated that free course offerings encouraged them to use the center.

As centers face changes in funding status, centers might implement a sliding scale or other fee structure for participants. One center we visited already had been asking for voluntary donations from more affluent users of the center, and was considering establishing a “for pay” cyber café in the future. This center, like most of the centers we visited, was committed to providing their services for free for those most in need. How these issues might affect long-term sustainability was addressed subsequently in this report.

While noting the relevance of free services, it was also important to add that participants at nine of the twelve sites we visited were able to start using personal home computers because of what they learned at the centers. In some instances, individuals already owned computers—given to them by adult children or grandchildren, for example—but did not know how to use or even connect them. In other instances, participants became motivated to purchase a computer after first developing their capabilities at a CTC. In a few instances, we observed that the support participants receive from the CTC program did not end at the center doors. Some staff helped participants shop for computers, set them up, and fix problems as they arose. That many people of low-income were able to acquire a computer for home use as a result of participating in a CTC program did not come as a large surprise to staff at the CTCs. Many shared the understanding that the real cost of technology was not the price of the hardware and software, but rather the support needed to learn how to use it—from initial

set up to advanced applications. This support might be one of the biggest contributions towards increasing access across the centers we visited.

## Learning Opportunities Meet Participants' Needs

A common aim for the CTCs we visited—from the industrial northeast to the agricultural southwest—was to be responsive to the needs of members of the community they serve. Perhaps the most important way these CTCs responded to participants' needs was by providing them with appropriate and meaningful learning opportunities. Our analysis of practices suggests that the CTCs we visited employed common approaches to structure informal learning opportunities, including providing:

- Multiple supports for learners of various levels
- Activities that are relevant to learners' lives
- Connections to schools

### *Supports for Learners of Various Levels*

Without exception, at every CTC we visited participants spoke to us about how well the program offerings matched their particular skill levels and needs as a learner. Most often, we heard these types of comments from seniors, who stated that they particularly valued the adjustments in pace and increase in teacher-to-student ratio that were made for them. Since most participants first coming to our CTCs had little, if any, experience with computers, supports for novice learners was especially important.

At the same time, many CTC participants had, over time, become highly capable using digital technologies, and needed special support of a different type. In these cases, staff often provided more advanced and, sometimes, individualized programming. Many preteen and youth groups in the CTCs we studied, for example, created their own digital media productions, exercising the higher-end of center resources. Adults and seniors, too, at times needed support at levels that went beyond typical center offerings. At centers where we observed cohorts of participants who were more advanced, we also saw them engage in peer-to-peer instruction, adding another layer of pedagogical support within the CTC learning environment.

Nearly all the CTCs we visited provided participants the structure to move in and out of the program as needed, wherever the participant was situated as a learner. This type of

fluid structure created opportunities for faster and slower learners to be able to make use of center offerings for their own purposes. At almost every center we visited, there were several people who repeated courses multiple times so that they would feel more comfortable with the information. By doing so, they were able to loop back to pick up dropped lessons, go deeper into the material, and make the content more meaningful.

### ***Activities Relevant to Learner's Lives***

Because of their status as voluntary educational organizations, it would be difficult for CTCs to endure if they were not relevant—that is, helpful and meaningful—to participants' lives. Our site visits provided us with ample evidence that best practices at the U.S. Department of Education CTCs are consistent with current theory on learning and cognition that emphasizes the importance of engaging participants in authentic projects (Bransford, Brown & Cocking, 2000; Means & Olson, 1995). These projects ranged from individually developing marketing materials for small businesses to collaborative efforts at creating newsletters, producing a public service announcement, or promoting an indigenous peoples' conference. In each case, the participants we interviewed elaborated that undertaking these projects helped them to be more productive and more hopeful about their future ability to meet their personal and professional goals using digital technology.

One of the main features of project-based learning is that students develop useful skills as a result of their work designing and implementing their project (Blumenfeld et al., 1991; Means & Olson, 1995). An appreciation of a project-based approach to learning need not necessarily deny the value of programs designed to directly develop skills, however (Greeno, 1998), our site visits showed us that skill-building programs can, in fact, be experienced very positively by participants who connect them to larger issues in their lives (Adamy, 2001). Skills-based programs we observed, for example, helped adults pass the GED exam and helped elementary students advance above their peers in standardized tests.

### ***Connections to Schools***

At the eleven sites we visited which offer programs for school-age children, all included academic support and enrichment programs of one type or another. Two of the

school-based grantees we visited included in their after-school programming self-paced drill-and-practice software that was also used by teachers and schools during the school day. The students who used the CTCs after school could spend more time engaged using the software, effectively extending the school day for these students. At both sites, parents were encouraged to get involved in their students' activities and monitoring of their own progress. One of these sites provided portable versions of the drill-and-practice programming for students to use at home. A third site also provided portable word processing tools for students to use at home. At the seven sites we visited in which centers were housed in schools, parents of student participants or staff reported that the CTC helped involve families more in their students' learning. At most of these sites, student participation acted as a steppingstone for parent participation, increasing the level of technological fluency in the family overall.

Although we note positive outcomes of skill-building programs in creating links between schools and the community, our case study research provided us with examples indicative of the promise CTCs offer for helping schools build connections to the community—and vice versa—through collaborative, projects-based efforts. We observed this phenomenon at school-based CTCs and at community-based CTCs. Our case study showed the potential for CTCs to:

- involve students in hands-on projects that extend beyond the school and the school day,
- help students learn technology skills in addition to academic skills,
- help students use technology skills to learn to analyze more advanced and complex data,
- help students represent their newly acquired knowledge effectively and for the benefit of their peers,
- help teachers implement project-based learning approaches, especially those that include technology components, and
- link schools more closely to family and community heritages, adding legitimacy to these heritages and therefore a source of pride to students' school experiences.

Because of our limited examples, how well school-CTC collaborations are able to effect these types of outcomes remains a question for further study.

## Staff Qualifications

Much of what the twelve CTCs accomplished depended on, in our analysis, the personal characteristics and approach of the staff. More so than those with advanced technical skills or pedagogical content knowledge, staffers who were fully dedicated to the objectives of their programs and successes of the participants seemed to be the ones most likely to produce positive outcomes. Overall, we found that the most dedicated staffers:

- Had a depth of knowledge about the communities they serve
- Responded flexibly to the interests and needs of their participants
- Sought out multiple types of informal and structured opportunities to advance their own knowledge

### *Knowledge of Community*

Comparatively within and across centers, we observed that staffers who helped students best engage in learning activities at the centers were those with substantial knowledge of the participants' cultural backgrounds and their communities' institutions. These same staffers often were the ones who developed close relationships with center participants, thereby promoting a sense of belonging at the center. All the center directors we spoke with acknowledged the importance of hiring center staff from within participants' communities. Two of the grantees we visited, both of which house their centers primarily in schools, have done a particularly good job of hiring both junior and senior staff from within the communities they serve. In each of these cases, we observed relations between young participants and staff that were familial in their qualities of warmth and closeness.

Of course, not all staffers who had a depth of knowledge about participants' communities shared their ethnic background. Since most of the centers we visited served participants from an array of backgrounds, efforts to hire staff from within participants' communities often, by necessity, amounted to selecting individuals that understood a locality rather than represented all the various cultural heritages of residents in the area.

Some of the most dynamic and effective leaders we saw in our visits drew from a depth of knowledge about the many facets of their communities and the people they served.

### ***Flexible Response to Participants' Interests and Needs***

One of the main ways in which an understanding of participants' communities manifested itself was through flexible and supportive responses to participants needs and interests. For some of the centers we visited, responsiveness included an element of interpersonal closeness. These staff-student relationships were characterized by patience, concern, and a willingness on the part of the staff to work with students at their level until they learned a given skill. Many staff expressed their commitment to teaching in culturally appropriate and interpersonally supportive ways.

For the most respected staff we observed, their approach invariably included efforts to ease fears or doubts participants have about their own ability to learn technology. These efforts led to some staff using a "backdoor" approach to teaching technology skills to students who felt intimidated by the prospect of working with computers. This approach involved piggybacking technology skills onto adult basic education or ESL programming, introducing technology in small doses, and using more advanced peers to teach new skills to novice participants. According to center staff and participants, when gradually introduced to technology in this manner, fearful novices eventually began to feel comfortable enough to attend open lab hours in order to start exploring computers on their own. When this happened, staff reported that participants were usually ready to enroll in basic computing classes.

Again and again, across sites we saw that the most respected staffers were those with the highest levels of commitment and the consequent willingness, as one director stated it, "to grow with the students." Oftentimes, these staffers were technologically only one step ahead of the center participants, but this did not seem to affect their ability to help participants open the door to technology. Center directors and staff helped confirm this observation by indicating that just-in-time-learning for staff seemed to be adequate for the needs of the participants they were teaching. Staff who had recently learned new technological skills, we were also told, clearly understood the difficulties many learners had and showed them special empathy.

### ***Seek Out Informal and Structured Opportunities to Advance Knowledge***

Although CTC staff often lacked opportunities for professional development, those staff in our study who seemed to be most committed also seemed to find sufficient ad hoc or informal opportunities to improve their own level of knowledge and resources. They were also willing to help others do the same. These staff drew from numerous sources to learn: by asking questions of friends and associates, by “playing around” with a new application or piece of hardware, by using online or text resources, and by occasionally joining a class or group. In five instances, grantees supported staff to attend specialized training, either at a conference or through mentoring relationships. Although some grantees had a designated technical resource person on their staff, many did not, and needed to rely on their web of personal informational and textual resources to learn. The deeper and richer this web, the more opportunities staff had to grow.

During our visits we were told by staff at different centers that when center participants saw staff working to garner resources for their own learning, it served as a model of how to learn and also encouraged the perception of staff as “co-learners” and facilitators. If these staff were drawn from the community they served, seeing them in a “co-learning” role could provide an especially strong motivation for participants’ own trajectory of growth.

### **Sustainability**

While most of the CTCs we visited faced struggles in stretching their resources to cover their needs, the ones that belonged to community-based alliances seemed to be able to better sustain themselves by taking advantage of other organizations’ resources for programming, technical support, and staff development. Four of our multi-center grantees—the Seattle Community Technology Alliance, the CTC consortium in Lowell, the Appalachian Technology in Education Consortium, and the Mercy Net Centers—had all developed instructional modules, standardized procedures for efficient technical support, and ways for member organizations to exchange ideas and materials. Similarly, CTCs that were integrated into well-established host institutions seemed to be particularly able to benefit from resource sharing and complementary capabilities. Some centers, in particular, stood out to us as examples of this level of integration.

In several instances, we saw that support for CTCs could come from unexpected sources—departments of parks and recreation, for example. Staff we spoke with supported our interpretation that as community agencies and service organizations more and more come to see technology as a basic resource, they will be more inclined to financially support programs of technology access and learning. In a somewhat similar vein, organizations that are not by themselves about improving technology access but that need technology support for their functioning might become more willing to fund CTCs for their own benefit. In effect, the CTC could thereby become the technical support center for the organization which funds it; it serves both its host and the community. We saw this phenomenon at four of our centers.

While a position within a strong alliance or host institution can provide many resources to a CTC, among the CTCs we visited such relationships were of such a degree that they would be insufficient to sustain the CTC for very long once grant funding comes to an end. One exception that is worth discussing is UrbanVOICE in Oakland, Calif., which has created a regional consortium, Bay Tech, and received substantial, long-term funding to provide workforce training for industries in the San Francisco Bay area. Strong backing from corporations contributed to the success of Urban Voice's effort, as did its partnership with well-established public entities—in this case, the City of Richmond and Community College District of Contra Costa County—to secure other means of support, share costs, and act as fiscal agents.

Other centers have tried to develop models in which they generate fees by offering services to more affluent users, but these seem unlikely to be able to generate enough revenue to keep the center fully funded. An interesting counter-example was Mott Community College's Disability Network center, which has had some success with providing consulting services to corporate clients in the area to help them retain valued employees through assistive technologies. With a sharp rise predicted in the need for these technologies, the center is well placed to advise companies and individuals on the tools that match their needs and allow users to test them at the center before they commit to an expensive purchase. In all, it seems likely that many valuable services across the sites we visited will be sustained, but also, that without the commitment of substantial public or private funds, community technology services will be reduced for those with the fewest options to improve their educational, economic, and personal status through technology.

This likely decrease in services will come at a time when technological access and skills become more and more essential for normal levels of participation in society. As home computers and Internet access become ubiquitous among America's middle class, the least advantaged will find themselves confronting even greater differences vis-à-vis their fellow citizens in opportunities and life outcomes than they experience now.

## Policy Implications

In this section, we turn to consider possible policy implications of our case study findings. We recognize that case studies are limited in providing definitive evidence to policy makers about the overall effectiveness of programs; such evidence is needed to make important decisions about what to fund and what not to fund, among other things. At the same time, case studies can reveal important information about implementation of programs that can guide program directors in focusing their guidance to grantees on certain matters. Case studies can also illuminate needs for particular kinds of data that could better inform program directors about the effectiveness of grantees' efforts to implement programs. In this section, we consider some possible policy implications that follow from our case study findings and from scientific research on learning that could guide the Community Technology Centers Program Director in the coming year.

**Differentiate the program's GPRA indicator for providing new points of technology access.** Increasing the number of new and expanded access points where participants can learn to become more fluent with information technology was only one indicator of technology access. Across the case studies, we found that other factors shaped the degree to which participants had adequate opportunities to learn to use new technology. The location of community technology centers, how easy they are for participants to find, and how accessible they are by local transit all contribute to increasing technology access. The inclusiveness of centers, their success in reaching out to members of the community, the range of technology and learning opportunities available to participants, and the cost of participation are all factors that shape how "accessible" a center really is.

There should be additional indicators of technology access for which centers are held accountable. Centers should have an outreach plan and develop strategies for targeting the

groups in their community they wish to serve. Centers also need to survey participants and potential participants about how accessible the center and its services are to them. Such surveys could include questions about how long it takes them to get to the center, how they get to the center, and whether the schedule of classes fits well with their schedules. They could also include items designed to find out more about places where centers could do additional outreach to communities they hope to serve, using participants and non-participants as informants to improve access to centers.

**Encourage centers to gather information from multiple sources on evolving individual and community educational needs.** As part of their applications for funding, all grantees had to demonstrate that their communities had a genuine need for a community technology center. Many discussed both educational needs and technology access needs. However, from our case studies, it was clear that not all centers revisited those needs or adjusted programs in light of changing participant and community needs. Across the community technology centers in our study, we found that grantees that offered a variety of program offerings and changed them in light of attendance data and participant feedback were places where staff and participants were most satisfied with their learning experiences. A recent meta-analysis of after-school programs conducted by RAND reported a similar finding. Researchers in that study found that programs that had flexible program offerings and provided sufficient variety of activities to youth were more successful in achieving social and academic outcomes (Beckett, Hawken, & Jacknowitz, 2001).

Many of the centers we observed relied on multiple sources of information about community needs and periodically “took the pulse” of their participants’ reactions to program offerings. Such practices should be encouraged more broadly among grantees. Grantees could examine their attendance data periodically to determine what kinds of classes are well attended and popular with participants. They could interview and survey participants about the kinds of classes they would like to take. Grantees could also call upon participants’ broader social networks to gather information on participant needs. We observed centers relying on information from a wide range of social networks, including senior groups, churches, soccer teams, and industry officials. They could also provide avenues for participants to make recommendations for new classes, as many centers in our study did.

**Profile programs with responsive staff.** Our cross-case analysis finding that participants in the centers we visited consistently made positive remarks about instructors' patience and skill in helping them to learn to use technology is consistent with findings from other studies of out-of-school learning. In the same RAND study cited above, researchers found that staff in successful programs were particularly skilled at establishing and maintaining a positive emotional climate (Beckett et al., 2001). In the case of community technology centers, staff at the centers we visited were skilled in helping reduce initial fears of some users that they might "break" the computers and staff's willingness to review and go over material that had been covered before without labeling learners as deficient in any way.

Even though we heard many staff praised in this way, not all the staff we observed were viewed as equally skilled by participants. For this reason, we believe it might be useful to identify selected instructors in community technology centers that are widely respected by participants. How they work with students could be described in some detail, with the goal of helping grantee directors understand what goes into being an effective instructor in a community technology center. In each case, not only the instructional methods could be highlighted but also the particular ways that instructors interact with students could be emphasized, to make visible the particular skills that participants speak to when complementing their instructors (e.g., patience). These profiles could be incorporated into a report or they could be developed as multimedia case studies for the America Connects Consortium Web site.

**Fund applicants who have strong existing programs that they seek to enhance with technology.** Nearly all of our case study sites took a year to become "fully functional" from the time they won funding from the U.S. Department of Education. Some took even longer, and in most cases, the first year of educational programming proceeded with many bumps in the road: outreach had to be conducted, building permits were delayed, instructors could not easily be found, program offerings were tried and then revised, and so forth. As the program has shifted to providing one-year grants, it becomes imperative to provide funding to grantees that already have some kind of educational programming in place.

Some of the grantees that were particularly successful in getting a quick start already were offering adult education or after-school youth programs, for example. They were, in

the most positive meaning of the term, “opportunistic” in the way they sought to use technology: these grantees saw in technology an opportunity to enhance an already successful program. Winning a community technology center grant allowed these grantees to accomplish this goal. Getting started, for these grantees, involved creating a technology infrastructure and preparing staff to use the new technology, no small task in and of itself. It was that much harder for grantees to get off to a quick start if they had to find a location, hire staff, and also develop educational programs from scratch.

In the future, potential grantees that have a demonstrated record of success in implementing adult education and after-school youth programs could be given funding priority. A grantee’s record of success in this instance would involve showing evidence from evaluation studies of past programs’ effectiveness and demonstrating its capacity to absorb new programs. Giving priority to these types of sites would help increase the likelihood that a one-year grant could successfully implement new technology programs and provide data on their effectiveness as required by the U.S. Department of Education.

**Use research on effective after-school programming to enhance educational outcomes.** Many of the centers we visited had links to schools. Some grantees were school districts, some community technology centers were housed in school buildings, and some centers had access to technical support resources of schools. Other grantees relied on certified teachers to offer instruction in the after-school hours. Still others offered programs that included academic support activities or youth projects conducted in collaboration with local schools. From our review of grantees’ annual reports, we know that many of the CTC program’s centers offer a variety of educational programming for youth, ranging from reading and mathematics programs to homework centers to ESL programs (Korbak, Penuel, & Kim, 2002).

Grantees working closely with schools to improve educational outcomes for youth would likely benefit from being directed to review relevant research on effective after-school programs. There is an increasingly large body of research on the effects of how young people spend their out-of-school time on academic achievement. Variety in youth programming is important, according to this research. For example, in their meta-analysis of 25 youth programs that showed at least one significant effect, Catalano, Berglund, Ryan, Lonczak, and Hawkins (1999) found that nearly all of the programs had a focus on developing students’ cognitive and social skills and sought to strengthen cognitive, social

emotional and behavioral competencies among youth. Engagement in these activities in the after-school hours, moreover, is associated with higher performance in school (Posner & Vandell, 1994; 1999). Incorporating strategies that have been shown to work to improve academic skills, such as peer tutoring, may be an effective way to improve academic outcomes as well (Cohen, Kulik, and Kulik, 1982).

The U.S. Department of Education has commissioned a number of studies of after-school learning program and has developed its own guides for programs that may be of use to programs seeking to strengthen programs. For example, the *Safe and Smart: Making After-School Hours Work for Kids* report, jointly authored by the U.S. Departments of Education and Justice, highlights research evidence on the potential of after-school programs to increase the safety of children, reduce their risk-taking, and improve learning.

In addition to having grantees increase their understanding of the relationship of after-school programs to school achievement, applicants for CTC funding who present well-developed approaches to complementing or enhancing school-based educational outcomes could be given special consideration. Additionally, the U.S. Department of Education could undertake to more systematically study and describe for grantees programs that might provide examples of how CTCs can effectively work with schools or otherwise enhance educational outcomes. This type of study would require additional research to identify programs that do, in fact, enhance achievement and are exemplary of best practices in this regard.

## Recommended Future Research Studies

More rigorous evaluation research studies are needed to determine the impact of community technology centers. Randomized experiments provide the best answer to the question, “Does participation in a community technology center cause improvements in educational outcomes?” However, defining the particular educational outcomes for such studies will undoubtedly be a complex undertaking and will necessarily need to be prefaced by studies to identify whether such outcomes are even possible to achieve. The focus of interventions varies widely across centers, as do the particular age groups served by centers. Some participants have very little experience with technology; others come to centers ready to participate in classes that will teach them sophisticated technical skills.

Some centers serve wide geographic areas, while others serve more narrow, but populous ones. There are, therefore, multiple possible outcomes to study, each appropriate to particular populations of participants with particular backgrounds, and so forth.

We recommend that in future years, multiple smaller-scale outcome studies of centers be undertaken. These studies would each need to target a cluster of centers with similar goals, instructional strategies, and target population. A first set of studies for each cluster would ideally focus on evaluating the opportunities to learn (Herman & Klein, 1997) within each center. The term “opportunity to learn” refers to the frequency, depth, and quality of instruction or educational activities that participants enjoy within programs. Studying opportunities to learn in a center would involve conducting systematic observation and surveys to be able to characterize the learning environment of the center. Important questions that might be answered by such a study include: Are students given adequate exposure to the material to master concepts being taught? Are standards for adult basic education or after-school programs evident in classes? Do students receive good feedback from instructors when they are off-track? Such studies would be logical next steps from our case study research, since from this research we have identified the range of ways that instructional arrangements differ from center to center.

It is important to note that researchers need good data on opportunity to learn *before* undertaking impact studies. Some programs are not well developed; many of those offered in the first year of a community technology center’s operation. In addition, very few programs are implemented as expected; some are not well implemented at all (Lipsey & Cordray, 2000). If programs are not implemented well, one can anticipate what the results of an impact study will be—negative. Yet, if an implementation study can help researchers and policy makers identify strategies to improve implementation, and, subsequently, programs can implement these strategies, then an impact study is more likely to yield useful results that can indicate whether the program is effective or not.

In the area of adult basic education, opportunity-to-learn studies would best be focused on understanding better how programs gain and sustain participation from adults. Some center staff informed us that participants came to those centers for the technology experience; others said that their participants had come to learn English as a Second Language. At present, we do not know what percentages of adult participants come to centers for these different reasons. If it turns out that technology attracts most participants,

but that English proficiency is the key goal for programming, then it would be important for programs to consider this disjunction in their outreach and their design of instruction. Knowing why participants continue to participate over time is important to understand as well. We encountered a number of participants who took multiple classes at centers—sometimes even taking the same class more than once. Some of them served as volunteers in the centers, acting as mentors and guides to newcomers. We suspect these volunteer roles are important, but we have little understanding of how essential they are in the instructional environment, adding significant learning experiences to both the mentor and mentee.


Studies focused on educational outcomes for children and youth might productively be focused on measuring the cumulative effects of participation in after-school activities on student achievement over time. Young people, in the course of their lives, typically participate in a variety of after-school activities; more intensive participation (at least 3 times per week) is associated with better academic outcomes (Posner & Vandell, 1994). Although it may not be desirable to grantees to use randomization to select some youth to participate in community technology center programs while assigning others to a control group, it is possible to select some participants at random to follow longitudinally. A matched comparison group could be selected from within the school population served, and both groups' educational outcomes could be tracked. But tracking outcomes would not be enough to establish the efficacy of community technology center programs. Detailed data on how youth spend their out-of-school time would need to be examined for both the treatment and control groups, because one would anticipate that educational outcome gains could be closely associated with level of participation in different kinds of after-school activities. It would be useful to determine, from such a study, not only if participation in community technology center activities leads to higher achievement, but also, in comparison to a matched group, if community technology participants are more likely to participate in other related after-school activities.

It is important not to overlook the opportunities out-of-school settings such as community technology centers may afford youth for developing fluency with information technology (National Research Council, 1999). Youth's opportunity to learn with technology in school may be limited to a few periods per week, when they have access to computer labs (Becker, 2000). Analysis of large-scale testing suggests that home access to

computers, but not school access, is associated with higher scores on computer literacy tests (North Carolina Department of Public Instruction, 1999). At home, technologically capable youth are often seen as competent problem-solvers and managers of relationships with external technical-help providers (Kiesler et al., 1999). To date, we understand little about the potential of community technology centers in promoting technology fluency, even though we know many centers offer programs to youth in computer recycling and repair, network administration, and Web page design. More research needs to be conducted that examines the role that community technology centers play in helping young people become more competent users of technology.

Our two years of case studies suggest that community technology centers have potential to significantly impact educational outcomes for both adults and youth, given the opportunities to learn they provide to participants. However, the extent of this potential has yet to be systematically measured by local or national evaluation efforts. We would suggest that the diversity of program offerings—rather than the failure of evaluation efforts per se—stands as a key obstacle to studying the impact of community technology centers. More detailed studies of the opportunities to learn within existing program offerings, a careful consideration of program outcomes to measure, and close attention to the potential threats to validity of impact studies are all needed as foundations for gathering evidence of community technology centers' impacts.

## Conclusion

Our case study findings suggest that in its primary mission of increasing access to technology for low-income Americans, the Community Technology Centers program is making significant progress. Taken together, all twelve grantees visited had opened all but one of the planned centers and offered programs at these centers, where no centers or free educational services had existed before. All of the grantees, in some way or another, also  thought about access in ways that were more sophisticated than assuming that the opening of a community technology center guaranteed access. The flexibility in program offerings and responsiveness of staff to community need were also evident across the centers, a key condition for success.

All of the grantees offered educational services to youth and adults, as called for by the Congress. These program offerings ranged widely in focus and target population from early literacy programs for kindergartners to computer literacy programs for seniors. In some cases, centers focused on a particular goal (e.g., increasing adult literacy levels), but in most, participants pursued diverse educational goals and programs were offered that attempted to match those goals.

What is still unclear is the degree to which the community technology centers we studied have developed model programs that demonstrate the effective use of technology. The evidence required under the new No Child Left Behind Act to prove effectiveness—evidence gathered through observation or experiment—is of a much higher standard than the grantees we observed collected through their local evaluation efforts. The diverse outcomes that even single grantees seek to obtain for participants and the need to be responsive to individual learners' goals makes it expensive for grantees to pursue such experiments as part of their grant activities. A much higher level of investment in the national evaluation of the program would likely be required to determine whether grantees have been successful at all in producing model programs.

There are important intermediate research goals that could help address the question of whether model programs have in fact been developed. More studies on particular desired learning outcomes are needed. In addition, studies of program implementation that describe the kinds of skills that could be developed through programming could be undertaken. Such studies would provide the foundation for determining what evidence-based practice could look like in community technology centers.

## References

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- Adamy, P. (2001). The primary importance of experience in the evaluation of educational technology. In W. Heineke & L. Blasi (Eds.), *Methods of evaluation educational technology* (pp. 197-210). Greenwich, CT: Information Age.
- Barron, B., Martin, C., Roberts, E., Osipovich, A. and Ross, M. (2001). Assisting and assessing the development of technological fluencies: Insights from a project-based approach to teaching computer science. In *Proceedings of the Computer-Supported Collaborative Learning Conference*.
- Becker, H. J. (2000). Who's wired and who's not: Children's access to and use of computer technology. *Children and Computer Technology: The Future of Children*, 10, 44-75.
- Beckett, M., Hawken, A., & Jacknowitz, A. (2001). *Accountability for after-school care: Devising standards and measuring adherence to them*. Santa Monica, CA: RAND.
- Blumenfeld, P.C., Soloway, E., Marx, R.W., Krajcik, J.S., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning: Sustaining the doing, supporting the learning. *Educational Psychologist*, 26, 369-398.
- Bransford, J.D., Brown, A.L., & Cocking, R.R. (2000). *How people learn: Brain, mind, experience, and school*. Washington, D.C.: National Academy Press.
- Catalano, R. F., Berglund, J. A., Ryan, H. S., Lonczak, H. S., & Hawkins, J. D. (1999). *Positive youth development in the United States: Research findings on evaluations of positive youth development programs*. Seattle, Washington: Social Development Research Group, University of Washington School of Social Work.
- Chapple, K., Zook, M., Kunamneni, R., Saxenian, A., Weber, S., & Crawford, B. (2000). *From promising practices to promising futures: Job training in information technology for disadvantaged adults*. San Francisco, CA: Bay Area Video Coalition.
- Chow, C., Ellis, J., Mark, J., & Wise, B. (1998). *Impact of CTCNet affiliates: Findings from a national survey of users of community technology centers*. Newton, MA: Education Development Center.

- Cole, M. (1998). Cross-cultural research in the sociohistorical tradition. *Human Development, 31*, 137-157.
- Federal Register (1999, April 28). Community Technology Centers Program; Notice inviting applications for new awards for Fiscal Year (FY) 1999. Vol. 64, No. 81, pp. 22,953-22,979.
- Fowells, L., and Lazarus, W. (2001). *Computers in our future: What works in closing the technology gap?* Los Angeles, CA: Computers in Our Future.
- Greeno, J. G. (1998). The situativity of knowing, learning, and research. *American Psychologist, 53*(1), 5-26.
- Grosshandler, D. J., & Grosshandler, E. N. (2002). The persistence of vision: A reflexive examination and narrative of sustainability and fulfillment in a small after-school program. *Hanging out: Community-based after school programs for children*. R. Garner. Westport, CT, Bergin & Garvey: 59-74.
- Herman, J. L., & Klein, D. C. D. (1997). *Assessing opportunity to learn: A California example*. CSE Technical Report 453. Los Angeles: National Center for Research on Evaluation, Standards, and Student Testing.
- Hipps, J. (2000). *An Evaluation of East Bay Neighborhood Links After-school Component, Year One, 1999-2000*. Oakland, California: WestEd.
- Kiesler, S., Lundmark, V., Zdaniuk, B., Kraut, R., Scherlis, W., & Mukhopadhyay, T. (1999, November). *Troubles with the Internet: The dynamics of help at home*. Pittsburgh, PA: Carnegie Mellon University.
- Korbak, C., Penuel, B., & Kim, D. (2002, July). *Summary of findings from annual performance reports of FY99 and FY00 grantees*. Menlo Park, CA: SRI International.
- Lambert, N.M., & McCombs, B.L. (1998). *How students learn: Reforming schools through learner-centered education*. Washington, D.C.: American Psychological Association.
- Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge, UK: Cambridge University.
- Lazarus, W., & Mora, F. (2000). *Online content for low-income and underserved Americans*. Santa Monica, CA: The Children's Partnership.

- Lentz, B., Straubhaar, J., LaPastina, A., Main, S., & Taylor, J. (2000). *Structuring access: The role of public access centers in the "Digital Divide."* Austin, TX: University of Texas. Available online at:  
[http://www.utexas.edu/research/tipi/Reports/joe\\_ICA.pdf](http://www.utexas.edu/research/tipi/Reports/joe_ICA.pdf).
- Lipsey, M. W., & Cordray, D. S. (2000). Evaluation methods for social intervention. *Annual Review of Psychology*, 51, 345-375.
- Means, B., & Olson, K. (1995). *Technology's role within constructivist classrooms*. Menlo Park, CA: SRI International.
- Merriam, S. B. (1998) *Qualitative research and case study applications in education*. San Francisco: Jossey-Bass.
- Moll, L. (1992). Funds of knowledge for teaching: Using a qualitative approach to connect homes and classrooms. *Theory into Practice*, 31(2), 132-141.
- National Research Council. (1999). *Being fluent with information technology*. Washington, DC: National Academy Press.
- Newman, D., Griffin, P., & Cole, M. (1989). *The construction zone: Working for cognitive change in schools*. Cambridge, UK: Cambridge University.
- Nicolopoulou, A., & Cole, M. (1993). Generation and transmission of shared knowledge in the culture of collaborative learning: The Fifth Dimension, its playworld, and its institutional contexts. In E. Forman, N. Minick, & C. A. Stone, eds. *Contexts for Learning: Sociocultural dynamics in children's development*. Oxford: Oxford University Press.
- North Carolina Department of Public Instruction. (1999). *1997-98 report of student performance: North Carolina Tests of Computer Skills*. Raleigh, NC: Author. Available at:  
<http://www.ncpublicschools.org/accountability/testing/computerskills/compskills97-98.pdf>. [Accessed 9/5/01]
- Penuel, W. R., & Kim, D. (2000). Promising practices and organizational challenges in community technology centers. Menlo Park, CA: SRI International. Available online:  
[http://www.sri.com/policy/ctl/assets/images/vStreets\\_Promising\\_Practices.pdf](http://www.sri.com/policy/ctl/assets/images/vStreets_Promising_Practices.pdf)
- Penuel, B., Korbak, C., Daniels, M., Kim, D.Y., Yarnall, L., Hawkins, J., & Pacpaco, R. (2000, December). *Community Technology Centers Program Findings*

- Summary: A review of FY99 grantees' annual performance reports.* Menlo Park, CA: SRI International.
- Penuel, W. R., Michalchik, V., & Kim, D. (2001). The organization of learning in community technology centers: Learning with technology in six communities. Menlo Park, CA: SRI International. Available online: <http://www.sri.com/policy/ctl/assets/pdfs/vstaera2001.html>
- Posner, J. K. and Vandell, D. L. (1994). Low-income children's after-school care: Are there beneficial effects of after-school programs? *Child Development*, 65 (2), 440-456.
- Posner, J. K. and Vandell, D. L. (1999). After-school activities and the development of low-income urban children: A longitudinal study. *Developmental Psychology*, 35 (3), 868-79.
- Riel, M., & Polin, L. (in press). Communities as places where learning occurs. In. S. Barab, R. Kling, & J. Gray (Eds.). *Designing for virtual communities in the service of learning*. Cambridge, UK: Cambridge University.
- Riel, M., Schwartz, J. & Hitt, A. (2002) School change with technology: Crossing the digital divide. *Information Technology in Childhood Education*, 1, pp. 147-172.
- Rogoff, B. (1995). Observing sociocultural activity on three planes: Participatory appropriation, guided participation, and apprenticeship. In Wertsch, Del Rio, & Alvarez (Eds.) *Sociocultural studies of mind*. Cambridge, UK: Cambridge University.
- Seppanen, P., D. deVries, et al. (1993). *National study of before- and after-school programs*. Washington, D.C.: Office of Policy and Planning, U.S. Department of Education.
- Strover, S., Straubhaar, J., & Tufekcioglu. (2001). *Evaluating the community technology training program at Reagan and Travis High Schools*. Austin, TX: Telecommunications and Information Policy Institute, University of Texas.
- U.S. Census Bureau. (2001, September). *Home computers and Internet use in the United States, August 2000*. Washington, DC: U.S. Department of Commerce.
- Vandell, D. L., & Su, H. (1999). "Child care and school-age children." *Young Children*, 54: 62-71.

- Wells, G. (1999). *Dialogic inquiry: Towards a sociocultural theory and practice of education*. Cambridge, UK: Cambridge University.
- Wertsch, J. (1997). *Mind as action*. London: Oxford University.
- Yin, R.K. (1994). *Case study research: Design and methods*. (2nd ed.) Thousand Oaks, CA: Sage Publications.

## Appendix A: Example Interview Protocol

## Appendix B: Debriefing Form

## Appendix C: List of Propositions for Cross-Case Analysis

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