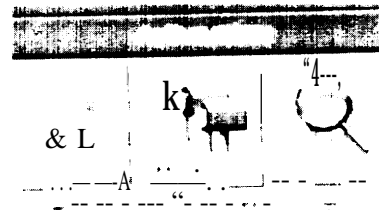


Summary and Policy Options | 1

After working all day in a chicken processing plant and cleaning offices until 10:30 pm, Eraclia Benitez has little time to help her children with their homework. Even in those few hours on weekends, when she's finished the cooking, cleaning, and shopping, and has gone to the laundromat, Eraclia cannot read to them or answer their questions about school work. She's caught in a double bind-she is unable to read or write in either Spanish or English.¹

When the steel mill closed, 48-year-old Howard LeHuquet was laid off after 18 years as a blast furnace worker. He decided to train for anew career in computer repair or air conditioning and heating. When he took the entrance test (almost 30 years after finishing high school), he failed on the math and was told to try something else. "Now why do you need so much math . . . to fix an air conditioner or a refrigerator? I was working all these years, paying the bills, paying off this house, making car payments. You don't realize time goes by and then, *bang*. It's gone. Everything is math," laments LeHuquet. Now he hits the job market every week, looking for any kind of full-time job with health insurance; currently he is working as a security guard 2 nights a week.²

Siman Skinner is an independent contractor who tried numerous methods of learning to read before coming to the Columbus, Mississippi, Learning Center. "When I come in here, I couldn't read a lick. I couldn't." As he talks about why he quit school, Siman relates: "I had a lot of problems with my eyes. Plus I was a slow learner, too. And after a while they just move you on up and I got disgusted with it." He's always worked. "I'd run crews for



¹ David Fritzse, "De Nada a Literacy-In One Generation," *Listening to Mothers' Voices: A Reporter's Guide to Family Literacy*, Education Writers Association (cd.) (Washington, DC: 1992), pp. 25-29.

² Dale Russakoff, "Lives Once Solid as Steel Shatter in Changed World," *The Washington Post*, Apr. 13, 1992, p. A14.

Coors Brewing Co.



For Sonya Davis (left), receiving her GED has opened the door to college, while for Janet Espinal (right), learning how to read has led to a job as a secretary,

companies, and they never knew I couldn't read. There's always somethin' you can do to get by. Loopholes and the like. But it's pretty hard. " He motions toward the computer as he recalls past efforts: "I tried teaching myself, ordering tapes and such from the TV and all, and that's helped some but not like this. " When he came to the Learning Center, they put him on the computers. "Yeah, I got a lot of 100s. I'm going pretty fast. But I've skipped some stuff. Sometimes it's hard to see the pictures, it not completely clear on the screen. " This time he's determined to make it through, changing jobs so he won't be on the road all the time and can stick with the classes. "It takes time, sure. Just a little stump in the road, that's all. "3

People who seek literacy services come from many different backgrounds and have many different motives for wanting to learn. "The target population [for literacy services] encompasses Americans who are employed, underemployed, and unemployed. ' They can include:

- women who need to reenter the workforce after a divorce;
- teenage mothers who dropped out of school when they became pregnant;
- immigrants with master's degrees who speak no English;
- children of Hispanic migrant workers whose itinerant way of life limits their time in school;
- recent high school graduates who are having trouble finding a job;
- middle-aged auto workers whose plants recently closed;
- full-time homemakers who want to help their children with their homework;
- people who need to improve their mathematics skills to be promoted at work;
- truck drivers who need to pass a federally mandated written test to keep their jobs; or
- prison inmates who want to be employable when released,

An array of public, community-based, and private adult literacy programs exist to help people like Eraclia, Howard, and Siman. Yet the national approach to adult literacy education falls short in several critical respects. The vast majority of adults with low literacy skills—perhaps 90 percent—do not receive any literacy services. A high proportion of those who do enroll in literacy programs do not stay long. Most of the instruction is provided by part-time teachers and volunteers, and the agencies and organizations that provide literacy services must deal with a host of persistent challenges, including insufficient and unstable funding, complex administrative requirements, multiple funding sources, and inadequate mechanisms for identifying and sharing effective practices.

What can be done to improve this situation? One answer lies in technology. Computer-based instruction, for example, can draw people like

³ SL Productions, video interview at the Columbus Learning Center, Columbus, MS, Nov. 11, 1991.

⁴ Larry Mikulecky, "Second Chance Basic Skills Education," investing in People, background papers, vol.1, Commission on Workforce Quality and Labor Market Efficiency (ed.) (Washington DC: U.S. Department of Labor, September 1989), p. 218.

Siman into programs and keep them engaged. Interactive video can bring education into the home for busy mothers like Eraclia and link them with other learners with similar concerns. Multi-media technology can provide a rich palette of resources for people like Howard. Sound, intriguing graphics, and live action video can bring new color to the black and white print-based world of learning. But creative uses of technology are the exception rather than the rule in most adult literacy programs today, the dream rather than the reality.

This study, requested **by the House Committee** on Education and Labor and the Senate Committee on Labor and Human Resources, seeks to answer this and other questions. In this report, the Office of Technology Assessment (OTA) considers why technology could make a difference in adult literacy, how it is used now, and what should be done to seize its potential for the future.

WHAT IS THIS STUDY ABOUT?

To assess the current and potential impact of technologies for literacy, it is necessary to understand the broader issues affecting adult literacy education in the United States. Therefore, this study begins by examining America's "literacy problem," shows how standards and requirements for literacy have increased over time, and documents the large number of Americans in need (chapter 2). Next, we show that adult learners have unique instructional needs (chapter 3) **that are only** partly being met by the patchwork of programs that provide adult literacy education (chapter 4). The study then analyzes how Federal policies have expanded adult literacy programs, but created a more fragmented system (chapter 5). The diverse web of adult literacy programs, however, faces common problems and needs that technology could help overcome (chapter 6). Nevertheless, the study shows that the potential of technology for both learners and programs is not being exploited, and significant barriers inhibit

wider or more sophisticated uses of technology (chapter 7). Finally, the study sketches a future vision in which better applications of technology make it possible to serve more adults and enable them to learn anyplace, anytime (chapter 8).

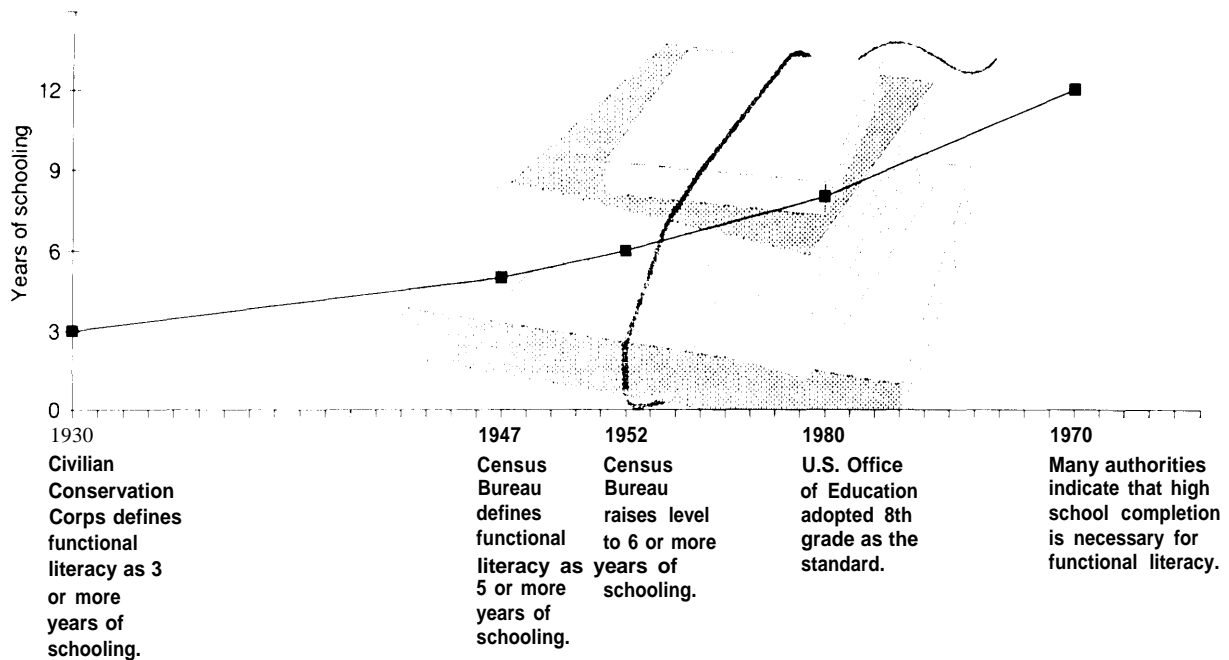
WHAT IS "LITERACY"?

Literacy is not a static concept. Almost 100 years ago, the proxy for literacy in the United States was being able to write one's name. Throughout this century literacy demands have become more complex and the standard for what constitutes literacy has risen (see figure 1-1). Despite considerable progress in raising the average level of educational attainment (today more than three-quarters of the adult population have completed high school), many believe that these gains have failed to meet the demands of a technological and global society. Scholars, educators, and policymakers are all struggling with how to redefine literacy to reflect changes in society, a global economy, higher educational standards for all students, and advances in technology. Technology, in all its forms, is having a profound effect on the ways people communicate with one another, shop, interact with social institutions, get information, and do their jobs. The current but evolving definition of what it means to be literate goes beyond the basic skills of reading, writing, and arithmetic. Other important skills being considered are higher order thinking and problem-solving skills, computer and other technology-related skills, literacy skills in the context of the workplace, and literacy skills as they relate to parenting and family life.

New Federal definitions of literacy incorporate some of these concepts: The **1991** National Adult Literacy Act defines literacy as: "... an individual's ability to read, write, and speak in English, and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and develop

4 I Adult Literacy and New Technologies: Tools for a Lifetime

Figure I-I—A Literacy Time Line: Rising Societal Standards for “Functional Literacy”



NOTE: This shows “literacy” in terms of years of schooling. OTA does not have data that allow comparison of average skill levels versus amount of schooling over this time period. The National Adult Literacy Survey (NALS) is expected to provide the first nationally representative data on the literacy skills of the Nation’s adults (ages 16 and older). Data will include types of literacy skills, levels, and how these skills are distributed across the population. The first NALS report will be released September 1993.

SOURCE: Lawrence C. Stedman and Carl F. Kaestle, “Literacy and Reading Performance in the United States From 1880 to the Present,” *Literacy in the United States*, Carl F. Kaestle et al. (eds.) (New Haven, CT: Yale University Press, 1991), p. 77.

one’s knowledge and potential.”⁵ The National Adult Literacy Survey, conducted by the Educational Testing Service for the National Center for Education Statistics, has adopted the following definition of literacy: “. . . using printed and written information to function in society, to achieve one’s goals, and to develop one’s knowledge and potential. Clearly, then, being literate means more than just being able to read.

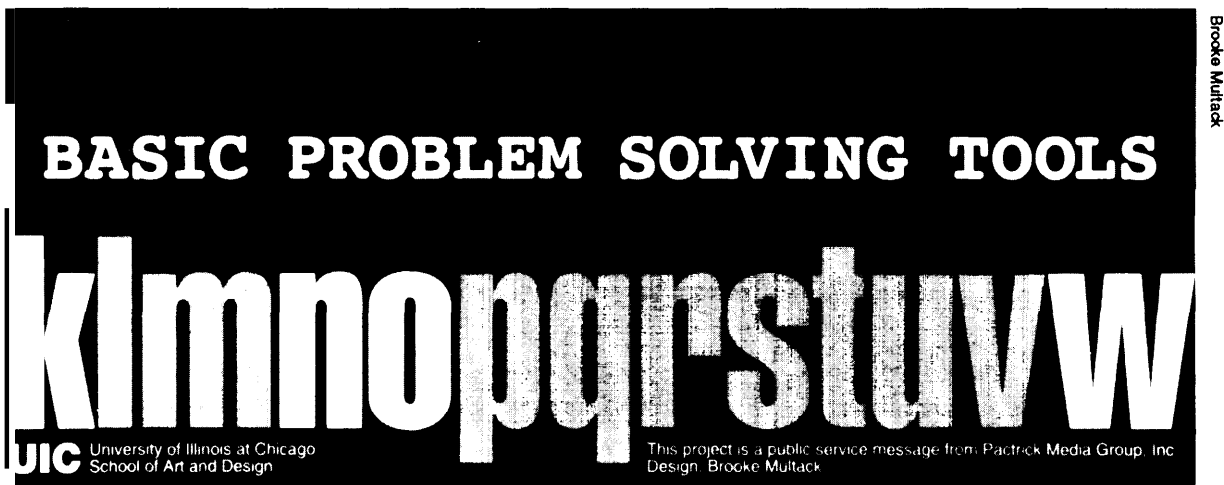
The way in which literacy is defined affects any estimates of the Nation’s literacy problem—how many people lack adequate literacy skills—which in turn affects how the Nation perceives its literacy problem. Depending on which definition

is chosen and which measurement method is employed, the problem can appear bigger or smaller. Those who want a quick estimate or simple yardstick are frustrated—literacy is not something that people either do or do not have, rather it is a continuum of skills that people possess in varying amounts. No single test or indicator can adequately discriminate between the literate and the nonliterate.

Nevertheless, whether the yardstick includes the performance of various literacy-related tasks, self-reported literacy problems, or educational attainment, the data suggest that a very large portion of the U.S. population is in

⁵ Public Law 102-73, Sec. 3, National Literacy Act of 1991.

⁶ Anne Campbell et al., Educational Testing Service, *Assessing Literacy: The Framework for the National Adult Literacy Survey*, prepared for the U.S. Department of Education (Washington, DC: U.S. Government Printing Office, October 1992), p. 9.



As this public service message suggests, literacy teaching goes beyond the basic skills of reading, writing, and arithmetic to include problem-solving and other technology-related skills.

need of improving their literacy skills. OTA finds that at least 35 million adults have difficulties with common literacy tasks (see box I-A). Although many of these adults can read at rudimentary levels, many need higher levels of literacy in order to function effectively in society, to find employment, or to be retrained for new jobs.

From all indications, only a small proportion of those in need of literacy education are receiving it. Government-sponsored literacy programs—the largest sector of literacy providers—currently serve about 4 million people.

OTA finds that the problem of inadequate literacy skills among adults is likely to grow over the next several decades. High rates of immigration and rising rates of poverty indicate that the number of children and families who are educationally at risk will continue to rise. These and other indicators suggest that literacy can be most effectively addressed through a “life-span” perspective that embraces both remediation and prevention. Literacy levels cannot be raised for the long term solely by remediation. Educational efforts aimed at adults with low literacy skills today, however, can have important intergenerational effects; in addition to improving the

life chances of the adult, they can increase the likelihood of positive educational outcomes for that adult’s children.

WHO ARE THE LEARNERS AND WHAT DO THEY NEED?

Adults do not stop learning when they end their formal schooling. Whether they finish high school or college, or drop out somewhere along the way, adults face changing roles and life choices, and as a result, continue to acquire new skills and knowledge throughout their lives. More and more adults are choosing or being required to return to formal education—to relearn skills they have lost, to acquire skills they never obtained, or to learn new skills that were not taught when they attended school.

Learning and going to school have most often been associated with childhood and youth; most current ideas about learning and teaching are based on educating children. Educating adults is very different from educating children, however. Adults bring a wealth of knowledge and experience that can serve as a foundation for new learning. At the same time, adults have many competing demands in their lives that reduce the time available for education. And while most

1998

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[illegible]

Adults (for 1989) w/ph:

- 8 years or less of schooling 19 million
- Classified as illiterate in the Danish Bureau's 1982 English Language Proficiency Survey 22 million
- Classified as functionally incompetent on literacy tests National Adult Performance Literacy Study (1975) 25 million
- Less than 12 years of schooling 34 million

Literacy Target Groups

Another way to attempt to estimate the size of the library problem is to look at different subgroups of the total population with a high likelihood of having inadequate literacy skills. Several such groups, and available estimates of their size, are presented below.

Adults not profiting in Berlin

- | | |
|---|------------|
| * Those who report speaking a language other than English at home | 20 million |
| * Those who report speaking English not well or not at all | 6 million |

Job sectors:

- There were many other people who were not in the room when the shooting took place. The police are looking for more people who were in the room at the time of the shooting.

[†]The National Adult Literacy Survey tested the skills of the nation's adults by asking them to perform tasks such as reading a newspaper article or filling out a form. The survey also asked how often they used these skills and how those skills are distributed among different groups.

1. **Full payment:** \$100.00
2. **Partial payment:** \$50.00
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4. **On 12/1/2002:** \$25.00
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adults participate in literacy programs voluntarily, their motives for learning vary widely. **Getting** abetter job is only one goal; others might include becoming more independent or being able to help one's children. **Addressing the literacy needs of the Nation must begin, therefore, with the adults themselves-what resources they**

bring, what skills they may need or want, how **they use literacy** in their lives, **how they learn**, and **what motivates** them to **want to learn more**.

Adults with low literacy skills form a very diverse group; few fit common stereotypes. For example, many adults with low literacy skills are

successful in the workplace, and have found alternative strategies for learning and surviving in a print-based culture. Often their lack of literacy skills is masked by other competencies, so that colleagues and peers remain unaware of their hidden problem. For others, low literacy skills go hand in hand with poverty, unemployment, poor health, and educational failure, creating roadblocks to productive, satisfying lives. People like Eraclia spend much of their lives getting by. But they are survivors, self-reliant and determined to be independent. While society may label them “illiterate,” each has developed sophisticated coping skills. They are also motivated by a desire to learn and the hope that becoming literate will help them guide their children toward a richer life than they have known.

People use literacy in their lives for many different reasons. Moreover, a person’s literacy skills may vary depending on the context. For example, a carpenter might be able to read and comprehend much more difficult material in a job-related manual than on a reading test. OTA finds that no one set of skills can be used to “certify” a person as literate, and no “necessary” amounts can be established. Needs vary and change according to the circumstances people face. These characteristics of adult learners suggest that the Nation needs a system of adult education that provides all adults with opportunities for lifelong learning as the world and their personal circumstances change, and that particularly encourages those whose limited literacy skills pose the greatest challenge.

Literacy programs should also recognize that people learn best when they are active participants in the learning process, when they are motivated by their own goals and interests, and when knowledge is presented in a context that is meaningful to them. To a large extent the present “system” of programs and services is designed



In this Los Angeles County jails educational program, inmates work on real literacy tasks designed to increase their chances of success following release.

for voluntary learners who come for assistance when they are ready. However, this segment of the population represents a very small proportion of those who could benefit from improved levels of literacy. The growing number of workplace and family literacy programs may be a way to bring more adults into literacy programs, by linking instruction and skills to immediate concerns and real life contexts.

There is a trend toward mandating participation of certain populations in literacy services (e.g., programs targeted at mothers on welfare and those in prison). This fundamental change may call for new instructional paradigms, but there is not enough data yet to know how these populations challenge traditional approaches to learning and measures of success. With an even more diverse learner population, research must focus on the learning strategies of adults, motivation and incentives, and development of approaches, learning materials, and technology tools.⁷

Adult learners also face special external and internal obstacles. Competing roles and responsibilities, situational barriers such as childcare or transportation, prior negative educational experi-

⁷ The newly created National Institute for Literacy is expected to play a major role in research. By law, the Institute is charged with providing a “... focal point for **research**, technical assistance and research dissemination, policy **analysis** and program evaluation in the area of literacy. . . .” Public Law 102-73, Title I, Sec. 102, National Institute for Literacy.

Box I-B-Advantages of Technology for Adult Learners

Reaching Learners Outside of Classrooms

- **With portable technology, adults can learn almost anywhere,** any time, and can use small parcels of time more efficiently
- Technology can carry instruction to nonschool settings—workplaces, homes, prisons, or the ~ @ *
- Adults can be served who would otherwise be left out because of barriers such as inconvenient class scheduling or lack of childcare or transportation.

Learning at home convenient and private for those who would feel stigmatized attending a P m -

Using Learning Time Efficiently

- **Learners can move at their own pace,** have greater control over their own learning, and make better use of their learning time.
- Learners can handle some routine tasks more quickly through such processes as computer spell checking.
- Many learners advance more quickly with computers or interactive videodiscs than with conventional teaching methods.

Sustaining Motivation

- **Novelty factor can be a drawing card."**
- **Technology can be more engaging, can add interest to** - - -
- Importance of computers in society can enhance the status of literacy instruction.
- Privacy and confidentiality are added to the learning environment reducing embarrassment adults often experience.
- Technology-based learning do not resemble those of past school failures.
- Intense, nonjudgmental drill-and-practice is available for those who need it.

☆ ■ ☆ ■ assessment not provided

Individualizing Instruction

- **Computers can serve as "personal tutors"—instruction and scheduling can be individualized with** without one-on-one staffing; Suitable for open-entry, open-exit programs.
- **Materials presentation formats can be customized to suit different learning styles, interests, or workplace needs.**
- **Images and sound can help some adults learn better, especially those who cannot read text well.**
- Computers with digitized and synthesized speech can help with pronunciation and vocabulary.
- Adults with learning disabilities and certain physical disabilities can be accommodated

Providing Access to Information Tools

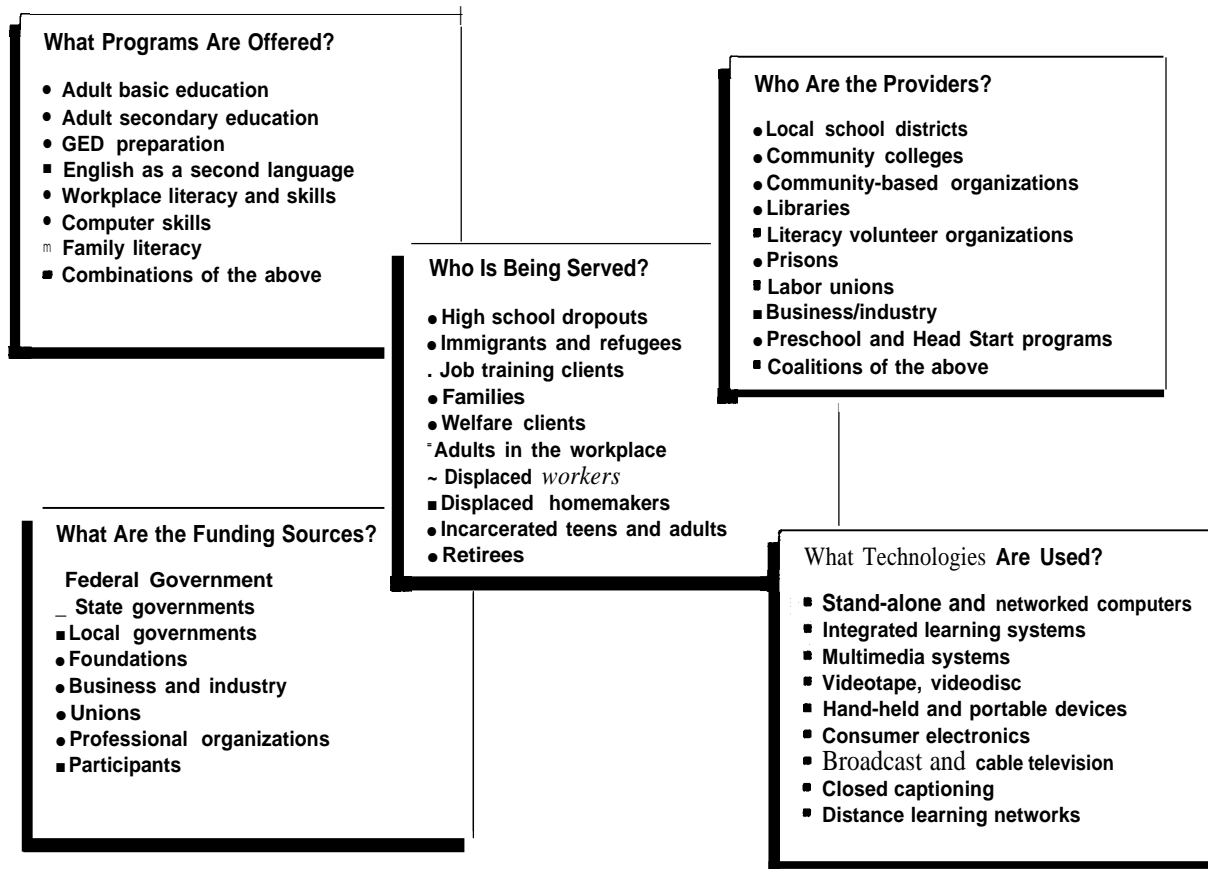
- **Adults need to learn to use today's electronic tools for accessing information.**
- Adults believe familiarity with computers will make them more employable.

SOURCE: office of Technology Assessment, 1993.

ences, and learning disabilities can easily deter all but the most motivated learners. barriers may need social and emotional support as well as flexible systems that match their schedules, pace, and learning style. Finding better ways to match **adult learners to services, removing barriers to participation, creating incentives for attending programs, and designing new strategies to**

deliver services and support learning are all necessary if we are to improve the system. Technology has the potential to eliminate some barriers to participation and address some of the unique needs of adult learners (see box I-B), but **the** current uses of technology in adult literacy programs have barely scratched the surface.

Figure 1-2—Adult Literacy Programs, Providers, and People



SOURCE: Office of Technology Assessment, 1993.

WHAT PROBLEMS DO LITERACY PROGRAMS AND PROVIDERS FACE?

The numbers of adult literacy programs and providers are growing, prompted by increased Federal, State, community, and philanthropic awareness of literacy as an economic and social issue. Public programs are the largest sector, serving an estimated **80 to 90** percent of those who sign up for adult literacy instruction. Although data on total funding for literacy are not available, statistics from the U.S. Department of Education indicate that State and local support for adult literacy has grown more than eightfold since 1980, and Federal funding has doubled.⁸ These

increases have spurred the expansion of programs and services. **But despite this growth, adult literacy education operates at the margin.** Unlike elementary and secondary education, with a clearly defined and long-established tradition of control by State departments of education and local school districts, adult education has no “system.” A patchwork of adult literacy services is provided in schools, community colleges, libraries, community centers, churches, housing projects, workplaces, and prisons (see figure 1-2). Although local school districts continue to be primary providers of adult literacy education, programs operated by community-based organi-

⁸See chs. 4 and 5 for further details.

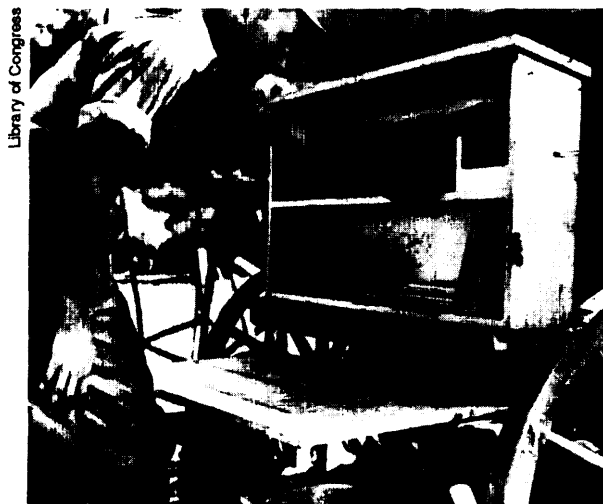
zations have expanded and there has been a slight shift away from school-based programs. Even so, much of the content is remarkably similar across the variety of sponsors. Adult basic education, general equivalency diploma (GED) preparation, and English as a second language (ESL) are among the most popular offerings, but interest is growing in family and workplace literacy. The availability of services to learners is not uniform, however; it is a function of where the learner lives and works, more than of what his or her needs are.

Just as the definition of adult literacy is complicated by the multiple needs of learners at various points in their lives, so too is the web of services complicated by multiple funding sources, administering agencies, and service providers. While this diversity may have advantages, it makes it difficult to address critical but common issues that plague many programs. The lack of coherent referral among programs, problems with recruitment and retention, a high dependence on

volunteers and part-time teachers (and consequently high turnover of staff), and a lack of adequate tools to measure program effectiveness cut across all programs and providers.

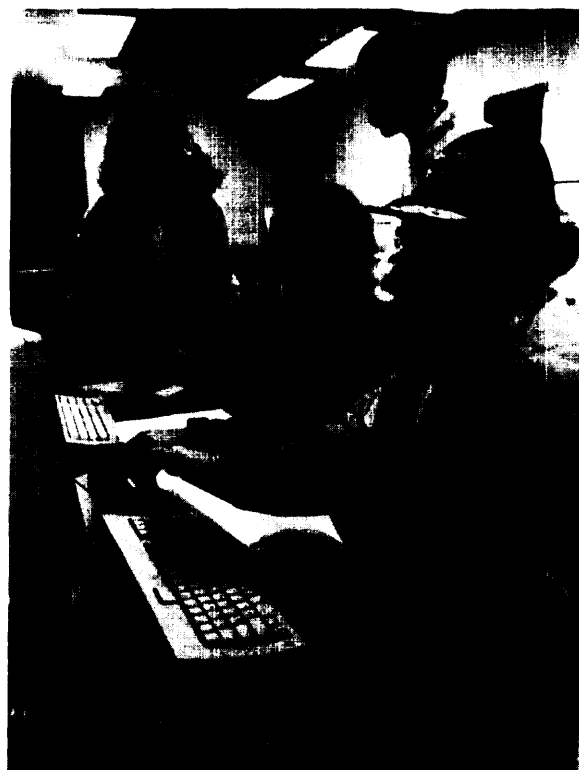
OTA finds that funding is a constant concern that affects all of the above. Many programs have waiting lists, especially for such popular services as ESL. For most programs, unstable and short-term funding patterns make it difficult to plan, purchase necessary materials or equipment, or develop professional staffing ladders.

Fragmentation of effort is another ongoing problem. At least seven Federal agencies, and often many more State offices, administer adult literacy programs; each has its own rules, reporting requirements, and funding channels. Some States and localities have sought to overcome fragmentation and make the most of limited resources by improving coordination among education, training, and social and employment services and eliminating duplication of effort.



Library of Congress

Adult literacy services have changed dramatically since the Federal Government's 1930s efforts to supply books to Work Progress Administration employees. Today, government is entering into joint ventures with private industry to provide computer-based literacy programs to employees at work, like this one at General Electric's Aircraft Engine Factory (right).



Jeff Heger

Some have also encouraged partnerships across local communities that link schools, businesses, churches, libraries, or other institutions to increase the level of support and marshal every available resource.⁹ Such efforts are not easily accomplished, however—programs need information on what is available in their communities so they can fill in gaps; they need help with administration and accounting; and they need long-term funding to overcome the high turnover of staff and learners.

Key and critical resources in every program are the people who work with learners and manage programs. The dedication and involvement of staff—whether paid or volunteer, full or part time—are extraordinary in most cases. But the demands placed on staff are also extremely high, and turnover is persistent. Most programs rely on volunteers to carry a heavy burden of instruction—one-on-one tutoring is the most common instructional format—and the majority of paid teachers are part time. Specific training in teaching literacy for adults is limited. Volunteers, while dedicated, may not have the grounding necessary for effective teaching, diagnosing learning disabilities, and helping learners find critical auxiliary services. Even licensed teachers need more training since few are specialists in adult literacy. Furthermore, teachers, administrators, and volunteers would gain from professional standards, graduate-level programs, certification guidelines, and career ladders similar to those found in other educational environments.

Technology could help alleviate some of the problems of administration, fragmented service delivery, recruitment and retention of clients, and

high turnover of staff and volunteers (see box 1-C). Electronic databases could help maintain information, track funds, and match learners to support services. Programs could use telecommunications technology to train volunteers and staff and connect them with one another to share information and reduce isolation. And technology could help programs move their resources beyond their physical location to reach learners wherever they are.

WHAT IS THE IMPACT OF FEDERAL EFFORTS?

Since the founding of the Republic, the literacy of adult Americans has been an abiding Federal concern. Up until the mid-1960s the Federal response was very limited. The passage of the Adult Education Act in 1966 changed the Federal role, creating a categorical grant program for adult literacy and basic skills education. This act and subsequent legislative initiatives have helped build and define key features of the delivery system today.

Legislation enacted since 1986 has expanded and transformed the Federal role in adult literacy, increasing appropriations, creating new programs, attempting to build capacity and coordination among existing programs, and assigning new literacy-related missions to programs with broader goals, such as welfare reform, immigration reform, and job training. The Federal Government currently spends at least \$362 million for adult literacy and basic skills education, more than double the amount of 5 years ago.¹⁰ Federal dollars have an important leveraging effect and are critical sources of sustenance for

⁹ The New York City Literacy Assistance Center and Baltimore Reads are two examples of how communities can pull together, build on existing educational capacity, involve businesses, bring in volunteers, and create entities that sustain **these** efforts by providing leadership, **technical assistance**, and **financial** support.

¹⁰ **This conservative estimate is far from a complete accounting of spending on adult literacy and basic skills.** Some **important programs—including** the Job Training Partnership **Act**, Job Opportunities and Basic Skills Training, State **Legalization** Impact Assistance Grants, Refugee **Resettlement**, and Even Start—have been omitted because the data needed to make a reasonable estimate of expenditures on adult basic skills is not available. The \$362 million was **calculated** by totaling appropriations for programs with identifiable adult education and **literacy** obligations in 19 of the 29 “core” programs on which **OTA** focused. Almost 90 percent of this total comes from Department of Education programs. For more detail see **ch. 5** and app. B.

Box 1-C—Advantages of Technology for Literacy Programs

Recruiting and Retaining Learners

- Technology can be a magnet, attracting learners.
- More learners can be served and teachers used more productively.
- Programs can broaden their reach, serving those in remote locations.
- Teachers and counselors can maintain regular contact with learners.

Improving Curriculum

- Teachers can create individualized, engaging instructional materials related to learners' needs and interests.
- Programs can share "what works" in terms of instructional materials and techniques.

Meeting Staff Development Challenges

- Teachers, volunteers, and administrators can be trained via video, distance learning, and self-study computer modules.
- Career ladders can be developed and information about vacancies can be posted nationwide.
- Staff can collaborate with their peers across town or country about problems, solutions, resources, and opportunities.

Enhancing Assessment and Evaluation

- Technology can track student progress continually, minimizing the need for "high anxiety" testing.
- Technology can provide diagnostic assistance for the teacher.
- Video and audiotape records, portfolio collections of writings, and other performance assessment measures can give more complete evidence of student progress.
- Program evaluation can be simplified by more systematic evaluation procedures and common data elements.

Streamlining Administration and Management

- Technology can more efficiently handle routine administrative tasks, freeing staff for instruction and providing comprehensive services to clients.
- Computer-based systems provide more efficient, accessible records on attendance, scheduling, personnel, budgeting, evaluation, and client tracking.

Augmenting Funding and Coordination

- Technology can serve as a magnet for fundraising and business contributions.
- Programs can pool resources and coordinate services, including social services, to serve learners better and avoid duplication of effort.
- Programs can share and access experts, databases, curriculum, public access software, government information, and national pools of literacy expertise.

SOURCE: Office of Technology Assessment, 1993.

many State and local efforts. Still the Federal literacy expenditure is small in comparison with overall State expenditures for literacy and for other major Federal education programs (see figure 1-3), meager in terms of the total population in need, and low as a national priority (see figure 1-4). There has been a proliferation of categorical grant programs with literacy-related missions. All this is at odds with the sort of

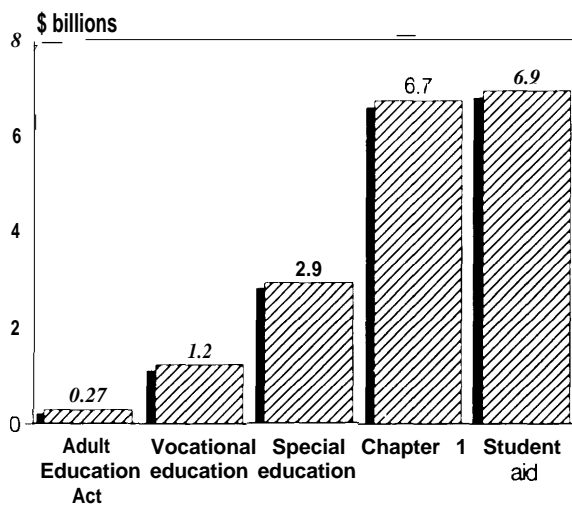
large-scale, coordinated Federal offensive that some feel is necessary to address the literacy challenge.

Among the new Federal emphases since 1991 is a focus on workplace literacy programs for employed adults. These programs are intended to meet the literacy demands of the job market and create new workplace/education partnerships that stimulate private sector literacy efforts. While

many leaders in business, labor, and local and State government support this direction for literacy, current efforts (both public and private) reach a very small number of workers. Thus far, Federal dollars have supported demonstration projects and limited “seed” development. Further expansion of the system of education and training has been proposed; how to accomplish the expansion is controversial.¹¹

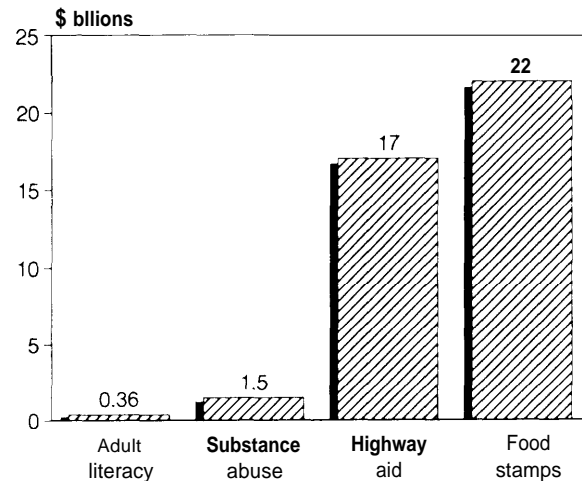
Another important emphasis has been on creating intergenerational family literacy programs. With their focus on prevention and remediation, they represent a small but significant shift in the Federal approach to the problem of literacy. Congress has begun to link family literacy initiatives with Federal Head Start and Even Start programs, as well as Chapter I. Effective parenting strategies that foster young children’s language development and school readiness are common concerns of all these programs. Similarly, expertise in adult learning is something that

Figure 1-3-Funding for Adult Education Compared With Other Federal Education Initiatives, Fiscal Year 1992



SOURCE: Office of Technology Assessment, 1993.

Figure 1-4-Funding for Select Federal Domestic Priorities, Fiscal Year 1992



SOURCE: Office of Technology Assessment, 1993.

teachers need whether they are in Head Start or adult education programs.

Targeted Federal programs have encouraged States and local providers to reach out to groups of adults, such as the homeless and welfare mothers, whose access to basic education has been limited. By channeling more funding through programs with restricted eligibility, however, the Federal Government may be limiting opportunities for the millions of adult learners, including many limited English proficient adults who do not meet special criteria but have the potential to quickly become functionally literate, self-supporting citizens.

New Federal requirements and policies are shaping State and local responses. For example mandatory participation and minimum hours of instruction in the Job Opportunities and Basic Skills (JOBS) training program and the literacy program for Federal prisoners represent a marked shift away from the traditional model of voluntary, open-entry, open-exit programs. Other pol-

¹¹Federal and State tax incentives to business, a national levy for education and training, and other mechanisms could be utilized. See U.S. Congress, Office of Technology Assessment, *Worker Training: Competing in the New International Economy*, OTA-ITE-457 (Washington, DC: U.S. Government Printing Office, September 1990).



In North Carolina at the Carver Family Literacy Program, an intergenerational approach to literacy seeks to provide the parent with literacy and parenting skills, and enhance the child's learning opportunities.

icy directives include efforts to improve the quality of services for learners through better coordination across programs, requirements for training and professional development of educational staff and volunteers, and moving toward learning assessments that are outcome-based. It is too soon to know how these “new requirements” for literacy programs will affect what is offered and who participates, but these are areas that should be followed closely.

The limited but promising use of technology is not surprising given the fact that the major Federal adult literacy laws¹² contain no provisions explicitly authorizing the use of technology; the exception is the Job Training Partnership Act (JTPA) and its authorization of the use of “advanced learning technologies.” However, no programs contain capital budgets for equipment purchase or explicit funding for teacher training in technology. Most statutory and regulatory provisions regarding use of technology are op-

tions, not mandates.¹³ The Department of Labor, the Department of Education, and the Small Business Innovation Research program have supported a handful of literacy-related technology demonstrations with discretionary money. The newly created National Institute for Literacy funded only three technology projects in its first round of awards. Taken together, the message about use of technology in adult literacy and basic skills programs from the Federal establishment, with the exception of the Department of Defense, has been “go slowly, if at all.”

HOW COULD TECHNOLOGY MAKE A DIFFERENCE?

Today's technology offers enormous potential for substantially changing the field of adult literacy. It could provide an alternative to the labor-intensive, tutorial-based teaching that makes up the bulk of today's literacy training. For instance, multimedia technologies with speech, video, and graphics could offer a new hope for those who have experienced repeated failures in paper-and-pencil-based educational activities. Computer-assisted instruction could enable learners to proceed at their own speed with materials relevant to their lives, tailored to their personal interests, and compatible with their individual learning styles. Hand-held electronics, such as pocket language translators, could allow adults to learn on the bus or during coffee breaks—whenever they are able to study. Electronic networks could remove the isolation and stigma of low literacy by enabling adults to share experiences in small group discussions. With closed captioning as a standard feature, learners will be able to see and hear the words on broadcast or cable television to reinforce language and

¹² For example, the Adult Education Act basic grant program, Even Start, State Legalization Impact Assistance Grants, Refugee Resettlement, and Adult Education for the Homeless.

¹³ The mandates that do exist, relating to the National Institute for Literacy and the Department of Labor National Workforce Literacy Collaborative, generally affect decisions at the Federal level, not programs in the field.

reading development.¹⁴ Interactive telecommunications networks could bring the best teachers from around the country to the most remote learners (see box I-D). All this is possible in technologies available today; much more will be possible in the next decade.

Yet the full range of capabilities has hardly been touched, OTA finds that technology is not a central consideration for most literacy programs. By the same token, adult literacy applications are not high priorities for most vendors and developers in the technology industry.

Computers are the most prevalent technology for literacy, but no more than 15 percent of literacy providers use them regularly for instruction, and many do not use them at all. Much of the available software provides drill and practice, not problem solving: many choices are geared for children, not adults. Advanced capabilities, such as speech recognition, speech generation, or interactive multimedia, are only beginning to be tested. Few literacy providers have sufficient technology for broad usage, or awareness of available software. More serious is the limited knowledge and training among staff and volunteers in the use of technology as a teaching tool.

Despite an explosion in cable, public, and commercial television channels and widespread ownership of television sets, there are only a handful of instructional television programs targeted to adult literacy that harness the power of the media. In fact, video technologies are surprisingly underused given their familiarity and availability.

A significant amount of hardware and software in businesses, homes, schools, and colleges is underutilized for literacy education. For example, common electronic devices, such as home video game machines, are largely ignored as technologies for literacy.

Box I-D-Distance Learning in Vermont

In Vermont, where icy roads can cancel classes and long distances can keep others away, learners from across the State have been working toward their general equivalency diploma (GED) through a series of courses held over Vermont Interactive Television (VIT). *The Lou & Dave Show*, a 10-week GED mathematics course, enrolled 30 learners gathered at local sites throughout the State. They had a great time learning mathematics, thanks to a blend of show business and team teaching from two of the best adult education instructors in the State, Lou Dorwaldt at one site and Dave Shapiro at another. They use video and on-the-air high jinks to bring mathematics to life, using real-life Vermont situations and people the students know as subjects for mathematics problems, playing custom-made videos that present problem-solving activities in entertaining ways, and even having "the spirit of Pythagoras" make an appearance to talk about his renowned mathematical theories. Learners in remote locations who feel isolated by their low literacy skills found interacting with other adult learners across the State an important psychological boost. The program coordinator suggests some of the other benefits of doing courses over VIT: "It cuts down on the tutors' regular work time and also frees up more money, not only from the tutors' workload but by creating our own texts. Students found themselves working in large groups, becoming more self-reliant, while learning how to work and help each other. These are important skills for all adults hoping to function in today's world."

¹ "Adult Basic Education: Expanding Horizons Over VIT," *Online, The Newsletter of Vermont Interactive Television*, vol. 2, No. 1, August 1991.

Why is there such a wide gap between practice and promise? While the barriers to more effective use of technology are similar to those faced in other arenas (most specifically elementary and secondary education), they are more severe in adult literacy programs. These barriers include needs for an expanded technology base, appropri-

¹⁴ The Television Decoder Circuitry Act of 1990 requires that all television sets with screen sizes 13 inches or larger, whether manufactured or imported for use in the United States after June 30, 1993, will have captioning capability built directly into the television receiver.



In this Vanderbilt University multimedia project, researchers are exploring how video, graphics, audio, and text can support the acquisition of reading skills.

ate software, staff training, and stable funding and continuing support. In addition, the literacy market is fragmented and underdeveloped; not particularly attractive to vendors and software developers. Even so, there are encouraging signs on the horizon as the technology infrastructure expands, investment in literacy education increases, and recognition of the importance of lifelong learning grows.

POLICY ISSUES AND OPTIONS

The Federal Government has attempted to attack the large, multifaceted problem of low adult literacy skills in a piecemeal fashion. The current array of modest to small programs provides something for almost every type of literacy need but not very much for any, with inefficiencies for all.

Although existing literacy programs have helped millions of adults lead richer lives, there

are many steps that would expand and improve services for adults with limited literacy skills and lead toward an integrated national strategy for adult literacy. These steps include both major initiatives and smaller, short-term strategies.

The first approach is a dramatic refashioning of the Federal role into a new scale of effort with greatly increased funding and higher visibility. The new program would expand, subsume, or replace existing piecemeal efforts. If Congress wants to bring adult literacy up to the level of other Federal programs that offer equal educational opportunities for those most in need (e.g., Chapter 1 and special education at the K-12 level, and Pen grants for higher education), a more comprehensive service delivery system will be necessary. This option is discussed at the conclusion of this section.

A more immediate strategy focuses on options for working within the existing system, while giving special attention to technology as a lever

for change and as a resource to benefit learners and programs. OTA has identified three major areas in which congressional action would make a real difference:

- building the base of technology (hardware and software) for literacy,
- improving the system of literacy programs and services, and
- experimenting with new alternatives, both within and outside of the current system to reach more learners.

Building a Base of Technology for Literacy

To accomplish this goal, two broad strategies are considered: increasing access to technologies and stimulating development of literacy software and programming.

Increase Access to Technologies

Having access to hardware is the first, most obvious gateway to using technology. If there is to be more technology use in adult literacy programs, the Federal Government must take legislative and regulatory steps that will stimulate and legitimize the use of technology in adult literacy programs and eliminate provisions that inhibit it. This can be done deliberately as Federal program reauthorizations come up, by taking special care to eliminate impediments to use of technology in existing laws and regulations, adding new provisions explicitly encouraging technology, and enacting directives for inter-agency cooperation on technology in literacy-related programs. The sooner this is done, the sooner the benefits will appear.

Remove Legislative and Administrative Barriers. OTA's analysis suggests that while there are few if any direct prohibitions against technology in literacy programs (e.g., legislative language prohibiting use of funds to acquire technology), there are several "indirect" but real impediments. Among them are antidisplacement and eligibility requirements that restrict the use of

equipment to a single target group, such as legalized aliens, even though a program might be providing instruction to a mix of clients including displaced workers, recent immigrants, welfare recipients, or high school dropouts. In addition, separate funding streams and accountability requirements discourage integrated planning, purchase, and use of technology. In some cases, technology is underutilized and certain learners are unable to benefit because courses of instruction or equipment purchases were funded by a program that will not or cannot share these resources with other programs (see box I-E).

Other barriers include evaluation or performance standards that emphasize immediate learning gains or employment outcomes, subtly discouraging long-term equipment investments or experimentation with technology-based instruction. Investment in technology is further inhibited by the absence of multiyear contracts in some Federal programs, the small size of most Federal discretionary grants, and a general suspicion among Federal policymakers and program administrators about the use of Federal funds for capital expenditures.

Although some States and local communities are finding ways around the maze of regulations, funding streams, and accountability requirements of multiple Federal programs, the Administration could lower the barriers and make it easier for literacy programs to acquire the technology they need. There are critical administrative actions the Federal Government could initiate now, including interagency efforts for planning, implementation, and regulatory revisions to allow cost-sharing for technology installation and applications.

In addition, the Federal Government can improve interagency coordination and thus increase the effectiveness of its adult literacy programs by developing a consistent governmentwide policy on technology for adult literacy and by using the tools of technology—such as integrated databases or teleconferencing—to promote coordina-

Box 1-E—Learn, Earn and Prosper: Mississippi's Project LEAP

Mississippi's Project LEAP (Learn, Earn and Prosper) is a satellite-based education and training program for Job Opportunities and Basic Skills (JOBS) recipients in 50 sites across the State. The distance learning courses recently developed by LEAP include reading, GED preparation, workplace readiness, and life-coping skills. These courses are restricted to JOBS clients only, because JOBS funding supports the instruction (five teleteachers and the teachers and aides at the local sites). Instruction is offered 4 days a week, 5 hours a day, and approximately 1,000 JOBS recipients are enrolled.

Although in only its early stages of development, Project LEAP has been inundated by requests from adult education programs to allow their students to watch the programs, since in many cases the downlink is located at a site where a mix of adult education programs are offered. Mississippi officials are attempting to cost-share the Federal program to allow greater use of these newly developed instructional materials.¹ Mississippi officials believe that they should be able to deliver these distance learning resources to many other learners—to inmates in correctional facilities, adults in adult basic education centers, and adults in their home.

Most of the satellite downlinks, it should be noted, were installed by the K-12 Federal Star Schools Program, and LEAP programming airs after school hours (from 4 to 9 pm). Mississippi has some 200 operational downlinks in schools across the State. In addition to Star Schools and Project LEAP, there are plans to use these distance learning facilities to offer an alternative high school program beginning in September 1993.² Plans are also under way to create a satellite-based training program for Head Start staff that will operate nationwide.

¹ Judy Williams, director, Governor's Office for Literacy and Workplace Enhancement, State of Mississippi, personal communication, Apr. 18, 1993.

² Ed Meek, director of resource development, Project LEAP, The University of Mississippi, personal communication, Apr. 19, 1993.

tion and improve program administration among agencies.

Encourage Technology Use Through New Regulations and Authorizing Language. Most Federal literacy programs lack explicit legislative language encouraging use of technology. Those provisions that do exist are options, rather than mandates to use technology or set-asides requiring a minimum investment in technology. In fact, the Adult Education Act (AEA) takes the opposite approach, capping the amount that may be used by the State resource centers for hardware and software at 10 percent. Congress could establish a set-aside for technology in the AEA (as it already has for other new initiatives, such as institutional corrections programs). Such a provision would likely gain some support among State adult education directors, who have recently

recommended that in the next reauthorization "the AEA should encourage a percentage of adult education allocation for innovation and technology in education."¹⁵ A set-aside would give programs "permission" to fund technology acquisition; without this explicit policy, many may not make this investment. The signal to hardware and software developers from such a set-aside and the degree to which it would stimulate the market for adult literacy technology development would depend on its size. (OTA estimates that a 10 percent set-aside would put \$25 million into the marketplace.

A fixed percentage of set-aside funds for technology acquisition would probably be insufficient for small programs. It is important, therefore, that Congress take parallel steps to allow Federal funds to be pooled with other funding sources.

¹⁵ U.S. Department of Education, Division of Adult Education and Literacy and Office of Policy and Planning, "Summary of state Adult Education Directors Forum, Feb. 18-19, 1993," unpublished document, p. 12.

Provide Direct Funding for Technology. Congress could provide capital funds for hardware and software acquisition for adult literacy programs directly through new Federal grants to local literacy programs. The amount of funding could vary with program size and scope.¹⁶ To leverage the Federal investment, Congress could require a match with local, State, or private funds. Grants could require communitywide technology planning and cooperation across Federal programs. For example, if the major Federal programs (AEA JTPA, Head Start, and Chapter 1) were combined, it would have a substantial effect, increasing the pool of dollars available for technology. Technology resources could be located centrally or dispersed. The point is that the involvement of an entire community would aggregate demand and drive down the costs of hardware and software.

Planning and cooperation on a regional or State level would increase the effectiveness of available funds. Statewide technology initiatives in K-12 education in Florida and Texas, for example, have made it possible for schools to acquire computers, multimedia technology, and telecommunications capacity at lower cost than if each school or district made purchases separately—a good model for adult literacy.

Stimulate Development of Adult Literacy Software and Programming

Effective use of technologies requires quality software and programming tailored to the needs of adult learners. Available computer software is inadequate for the demands of literacy programs, and programming for video and other technologies is even more limited. The Federal Govern-

ment has provided millions of dollars of research and development (R&D) support to develop educational television programming for the elementary, secondary, and college levels, software tools and networking applications for science and mathematics, and distance learning systems for K-12 education. By contrast, the Federal investment in programming, software, and networking applications for adult literacy has been almost nonexistent, except for the military's development of computer-based materials in basic skills.

Create an Adult Literacy Software/Programming Initiative. A targeted initiative is one way to speed development of a broad base of high-quality and effective applications of video, computer, and telecommunications technology for literacy. Congress could provide seed funding and encourage public/private partnerships among literacy educators, State agencies, software developers, and telecommunications providers, as it has done for K-12 distance learning through the Star Schools program. An appropriation of about \$20 million per year for the next 5 years would serve as a significant stimulant to the field.¹⁷

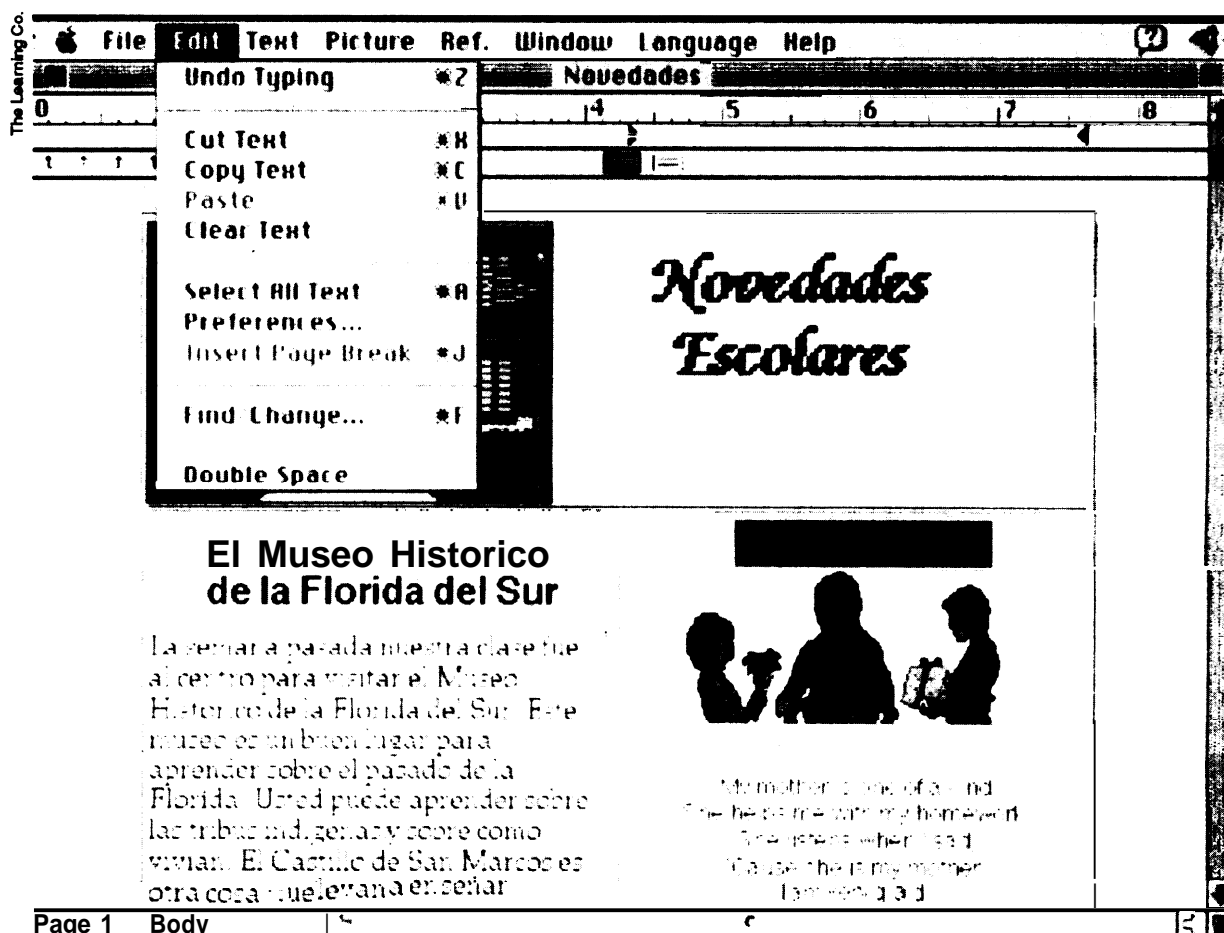
Any such development should include stand-alone video courses and modules, interactive distance learning programs, and computer software and multimedia learning materials that address high-priority needs, especially:¹⁸

- English as a second language,
- high school completion and GED,
- workplace literacy,
- materials and resources designed for learners with very low literacy skills (especially those

¹⁶ In plans for the new \$7 million citywide St. Paul, Minnesota Center for Lifelong Learning, \$500,000 has been budgeted for technology, including hardware, software, and telecommunications networking. Terilyn Turner, director, Center for Lifelong Learning, St. Paul, MN, personal communication, Apr. 24, 1993.

¹⁷ By way of comparison, Congress originally authorized the Star Schools program for 5 years, setting an overall funding limit of \$100 million. The National Science Foundation's application of advanced technology development is currently budgeted at approximately \$12.5 million annually for research and development in mathematics, science, and technology for all levels of education.

¹⁸ An adult literacy initiative could concentrate development of software and video programming in the areas of highest need. New data from the National Adult Literacy Survey of adults 16 years and older will become available later this year (September 1993). This data should help clarify the instructional needs of adults and which segments of the population are most in need of assistance.



By enabling adult learners to write in Spanish or English, this software program helps them learn English as they improve writing, thinking, and reasoning skills.

that make use of advances in digitized speech, graphics, and animation), and

- programs designed to reach both adults and young children in family literacy contexts.

Funding development of software and programming alone is not enough; the Federal Government would have to place equal priority on achieving broad distribution-making software and programming available across the range of literacy programs and providers, and bringing these resources to unserved learners in their homes and communities. Congress could require that rights and marketing strategies promote the widest possible distribution through cable, broad-

cast television, video rental stores, software and music stores, and other less traditional outlets—such as welfare offices, post offices, public health clinics, libraries, and the workplace.

Fund Software and Programming Through Existing Technology Programs. Another option is to use existing Federal technology program authority to fund development of literacy applications, rather than initiate a separate software effort. The Federal Star Schools program already authorizes instruction for literacy, as does the Ready to Learn Children's Television Act. The National Science Foundation's (NSF) educational technology programs, the National Telecommunications

and Information Administration's National Information Infrastructure program, and the technology programs at the Advanced Research Projects Agency (ARPA-Department of Defense) all have expertise in technology that could be applied to literacy. Without a specific allocation for adult literacy or a congressional mandate, however, literacy development will be largely left to chance and continue to exist at the margin.¹⁹ This approach also makes it difficult to address literacy needs systematically and avoid duplication of effort.

Improving the System

Two broad policy strategies are considered for improving the system of literacy services. The first strategy focuses on helping administrators, teachers, and volunteers become more effective. The second strategy focuses on strengthening the connections among literacy providers, social services, and the private sector.

Expand Training and Professional Development

It is one of the sad ironies of adult literacy education that often those with the least professional training are asked to help the learners with the greatest educational needs. The system is unlikely to get better without strengthening the professional status and expertise of those who teach, administer, and volunteer in literacy programs. Professional development should involve several parallel improvements: continuing training for adult literacy educators, curriculum development and graduate-level programs in adult literacy instruction, more rigorous standards and certification requirements, and strategies for recruiting highly qualified personnel to teach and administer adult literacy programs. Technology can be a resource in all these efforts.

Coordinate and Expand Inservice Training. Teacher training and professional development efforts are new objectives of the National Literacy Act of 1991. Training is one of the missions of the newly established State resource centers. The act also increases the State set-aside for training and resource development from 10 to 15 percent of the AEA State grants under Section 353. Even so, funding from these sources will be insufficient to support systematic training activities for many States. Section 353 funds amount to no more than \$25 million nationwide, and the \$5 million appropriated for State resource centers in fiscal year 1993 is spread across every State and the outlying areas.²⁰

One option for making the most of available funding is for Congress, through legislation, to allow States to pool Section 353 set-asides, along with State resource center grants, to create multistate or regional teacher training centers. Local adult literacy training funds could also be channeled into these centers. Similarly, training activities supported by other Federal and State programs involved in literacy training could be aggregated. Regulations should facilitate, not inhibit, training efforts that address common needs of adult literacy educators serving clients from JOBS, JTPA, Head Start, Corrections, Drug and Alcohol Rehabilitation, and other programs.

Collaborative training activities could also encourage cross fertilization of staff expertise. For example, teachers of young children in family literacy programs could study the learning problems of the children's parents; those who traditionally teach adults could learn about child development and early childhood education. The result would broaden the base of expertise in intergenerational literacy programs. Collaborations between those with training expertise in the workplace and those skilled in teaching reading and writing could encourage richer, more comprehen-

¹⁹ It is far, only two of the Star Schools projects have begun to experiment with adult literacy in a limited way.

²⁰ On a formula basis some States or territories receive as little as \$2,500, and over half the States receive less than \$50,000, which supports several other activities beyond teacher training.



Telecommunications technologies can be used to expand adult literacy services and programs.

sive workplace literacy programs. Social services counselors and ESL instructors might also benefit from joint training, as they learn more about the multiple needs and concerns of their clients. Collaborative professional development efforts could help to break down walls that exist between service providers funded from different sources, possibly creating a broader base for the profession.

Distance learning technologies could greatly facilitate multistate and multiagency training efforts by serving teachers and trainers in different locations and small programs. Federal Star Schools legislation now authorizes adult literacy instruction, and the telecommunications partnerships formed to serve adult learners could also provide training to literacy staff and volunteers. The most highly skilled teacher trainers, whether in community colleges, universities, or workplace programs, could train literacy instructors, counselors, and volunteers over interactive networks. Materials, strategies, and lesson plans could be created and shared over computer networks.

Support Adult Literacy Curricula and Graduate-Level Programs. Most adult literacy teachers and staff have received very limited specialized training in their field, and few universities offer advanced degree programs in adult literacy edu-

cation. Yet the challenges of adult literacy demand expertise in a range of areas: diagnosing and teaching adults with learning disabilities, creating curricula to meet the needs of culturally diverse populations, applying adult learning theory, and using technology—all in addition to acquiring the substantive knowledge to teach reading, writing, mathematics, GED subjects, and so forth.

Developing master's level programs and curricula is an essential step for producing a cadre of professional staff. Through the National Institute for Literacy (NIL), the National Center for Adult Literacy (NCAL), or the State resource centers, the Department of Education could work with universities to develop graduate programs. Another approach is to use distance learning technologies to pull together the resources and expertise of universities or regional consortia. One interesting prototype is the National Technological University—a consortium of engineering colleges and universities that provides advanced training and courses to engineers. This consortium was supported by the Department of Commerce's Public Telecommunications Facilities Program—a resource that could be tapped by the literacy community to bring together the necessary mix of faculty and programs. Additional Federal support can be channeled through the Department of Education's Fund for Improvement in Post Secondary Education, NIL grants, or new specialized grant competitions.

These programs could also target the development and distribution of innovative educational materials that bring instructional research, strategies, and resources to prospective and current teachers. Materials developed with this support should be made available in a range of technological formats, from tapes that can be taken home for review to state-of-the-art multimedia materials that can be distributed over networks.

Assist States With Their Professional Standards and Certification Guidelines. Almost one-half of the States have no special certification require-

ments for adult literacy teachers, and this has contributed to the low professional status of adult literacy education. If program quality is to be improved, more rigorous standards must be established for all adult literacy educators.

Certification is traditionally a State responsibility, but the Department of Education could assist by disseminating model standards. States such as New York, Connecticut, California, and Massachusetts are leaders in this area, and their experience could guide others. The Federal Government might also support efforts to develop regional or national teacher certification guidelines, or ask the National Board for Professional Teaching Standards to include a special assessment for adult education instructors.

Similar approaches at the State level could be developed for increasing the professional standards for volunteer tutors. Working from the models developed for tutor training by Literacy Volunteers of America or Laubach Literacy Action, States could develop certificate programs for volunteer training that would enhance the status, confidence, and effectiveness of volunteers. States could support volunteer agencies in their efforts to systematize standards for volunteer recruitment, training, and supervision.

Recruit More Teachers. If adult literacy programs hope to serve more than 10 percent of the target population, they will surely need more teachers. One potential source of new staff is military trainers being released as bases are closed and force levels are cut. Trainers from military basic skills education programs already have expertise in teaching adults, and many have extensive experience in technology-based instruction. To the extent that Congress establishes programs and provides funding to speed the conversion from military to civilian employment, it could capitalize on these trainers' skills by providing incentives for work in adult basic education, workplace literacy, and family literacy programs. Increased funding for additional literacy teachers could also be provided in other

Federal literacy-related programs such as VISTA (Volunteers in Service to America). If enacted, the new proposal for a Volunteer Service Corps for college students could be structured to include training of volunteers for adult literacy.

Encourage Coordination, Integrated Services, and Partnerships

Although some argue that the multitude of service providers and funding sources offers a rich variety of options and approaches, most agree that this disparate system creates problems for learners and diminishes program efficiency. There is often a mismatch between learner needs and program offerings; services are further restricted by a program's source of funding, target population requirements, location, and other factors. Many small programs are unable to aggregate the kinds of resources needed for planning, staffing, training, technology, and comprehensive services.

Better coordination would leverage resources more effectively and improve services to clients. Coordination must begin at the Federal level; mandates for State and local coordination are undercut when the Federal house is not in order.

Expand Federal Interagency Coordination. The National Literacy Act provisions for interagency coordination are a starting point for bringing coherence to the adult literacy field. The act mandates that NIL enlist cooperation among the Departments of Education, Labor, and Health and Human Services. If it is to reduce the fragmentation of literacy efforts, this interagency group should be expanded to involve the Department of Agriculture (Food Stamp program), ACTION (VISTA literacy volunteers), the Department of the Interior (Indian adult education), the Department of Housing and Urban Development (programs for public housing residents and the homeless), the Department of Justice (correctional education), the Department of Defense (basic skills training), and NSF (educational technology R&D and teacher training). All have

a stake in adult literacy, and experience and resources to contribute. Given the ease with which other such interagency coordination groups slip into oblivion, Congress would be well advised to exercise oversight to ensure that NIL is fulfilling its mandate to work with the Federal agencies and serve as a link between the State resource centers, local programs, and the private sector.

An immediate priority for this interagency group would be to coordinate definitions, funding cycles, and accountability, reporting, evaluation, and eligibility requirements. This group could begin with a focus on actions that do not require changes in legislation, while working to assist Congress in removing legislative impediments to cooperative efforts—particularly those concerning technology (see above).

Reward State and Local Coordination. Recent legislation and executive initiatives all call for coordination at the State and local level. Congress may wish to back up these requirements with “glue money”—incentives to help States and local providers develop, extend, and improve effective models of coordination. The approaches recently taken by California, Oregon, Georgia, New York, and Michigan share several important ingredients: formal cooperation among State agencies through interagency agreements; centralization of those elements that can be implemented on a statewide basis, including staff development and certification; development of common definitions, program standards, and evaluation measures; and systems for collecting common data elements and sharing information. The impact of these efforts will be greatly enhanced if they are disseminated to other States through information networks created by State resource centers. If Congress wanted to mandate coordination, it could require evidence of working partnerships among programs as a criteria for funding.

Coordinated efforts do not come about easily. Many programs fear a loss of independence, and turf is jealously guarded. Incentives must be

provided to assuage these fears and reward participation by making it easier, not harder, for programs to serve their clients. Furthermore, confidentiality is a serious concern when client data is coordinated and common records maintained. Issues regarding confidentiality—access to data, restrictions on personnel at various agencies, client oversight of personal records, and limitations of the use of records—must be addressed in this process.

Model Interagency Partnerships. If coordinated service delivery is to become more prevalent, we need better working models. Demonstrations of State and local systems of interagency coordinated service delivery should be part of federally supported R&D for adult literacy. These demonstrations should include evaluations of the difficulties encountered and analyses of the costs and benefits of coordinated services. Demonstrations of coordinated service delivery should integrate technology including client tracking systems such as “smart cards,” databases that update course offerings and space availability, and multi-service information kiosks for public use.

Partnerships between public and private programs should also be encouraged or required in regulations or funding plans. Offering tax credits to entities that provide space, facilities (e.g., work site technologies for literacy instruction), curriculum development, or teachers’ salaries is one way to encourage partnerships with private industry. While industries are usually willing to train their own employees, some incentives may be needed to encourage them to include other learners in their classes, whether they be “future employees” or members of the community in which industries are located.

Encourage Technology-Based Coordination and Dissemination. Technology can contribute to program coordination and effectiveness. Databases of program funding sources and their requirements could help programs seeking support from multiple sources. Technology could also ease

recordkeeping and reporting requirements when multiple funding sources are involved.

Technology can help improve program quality by facilitating evaluation. Computer tools can simplify data collection, track the progress of learners, and analyze outcomes.

To effect change the adult literacy community must have easy access to information about successful programs, new technologies, and effective strategies. Recognizing this need, Congress allocated funding for State resource centers, and charged NIL with disseminating information on promising approaches. Both of these entities have many tasks to perform, however, and are just getting under way.

The problem is not a lack of good information, rather the problem is good access to information. One of the most pressing needs centers around use of technology: How are computers being used? What software applications are effective? How can technology support the learning needs of specific groups such as ESL learners? What are the pitfalls to be avoided? One model might be found in the Outreach and Technical Assistance Network (OTAN) developed to serve programs in California. OTAN has a wealth of information on technology that could be useful to other States. Similarly, the growing base of technology information at NCAL is needed by programs across the country. The experience and expertise of the New York Literacy Assistance Center and other similar efforts can be tapped. The newsletters and reports of the Business Council for Effective Literacy are key resources for workplace literacy programs. Thus, a key strategy for NIL and the State centers is to tap into the resources that are already working and broaden access to them. Electronic networking, teleconferencing, and information databases are ways that technology can facilitate dissemination of information and provide support to people in the field.

Congress may wish to expand dissemination activities at the State and regional level. It is at this level that practitioners can play a key role by

helping programs and providers screen and evaluate computer software, sharing models of program coordination, and developing teacher training resources.

Experimenting With New Alternatives

In addition to expanding the base of technology and improving the system of existing adult literacy systems, it is time to step outside the constraints of the current system and ask some fundamental questions about adult literacy policy in the United States. How can the visionary applications of technology be made a reality? How can personal access to learning resources be extended to all adults, especially those who are not being reached by the current system? How could the Federal role in adult literacy be shaped into a coherent national strategy?

Technology has the promise to provide people with personal access to learning resources through computer tools that are portable and easy to use, video courses and modules, electronic libraries, and information services. Several questions should be explored to move in this direction: How would adults with low literacy skills use pocket electronic learning devices? How might they learn with a mix of courses and modules in video or multimedia formats? How could electronic networks (e-mail, voice mail, two-way interactive distance learning systems) be used for learning? If personal learning tools and telecommunications networks create new alternatives for learners, can they also create new alternatives for the larger system of programs and services?

Make Experimentation With Technology a Research Priority

If these alternatives are to be explored, the institutions currently charged with literacy R&D (NIL and NCAL) should take the lead, making experimentation with personal learning technology a priority for research. In the case of NIL, this must become a major commitment, particularly as funding levels increase. NCAL has already



Will we be able to exploit the versatility of new interactive technologies for learning and literacy?

taken frost steps toward making technology a central research theme by conducting forums on technology and adult literacy. As one of the Federal education research centers, NCAL should seek connections with others, particularly the Center for Technology in Education, to share knowledge and collaborate on research proposals.

Include Adult Literacy in Advanced Technology Initiatives

As Congress considers initiatives to spur advanced technology development, including a high-speed information highway for research and education, it can significantly increase the benefits by adding R&D focused on adult literacy programs and adult learners. Congress may also wish to include funding for partnerships between

software developers, telecommunications providers, hardware companies, and literacy providers; this would bring the right people to the table to reach every part of society.

Rethink the Federal Role

If Congress wishes to rethink Federal literacy efforts, particularly to significantly increase funding, raise visibility, and unify piecemeal efforts, it must focus on those with the highest priority needs. Current attempts to clarify the changing requirements for literacy and survey the literacy skills of the adult population are important first steps. Data from the National Adult Literacy Survey is expected to provide much more precise information on the level of literacy skills pos-

sessed by various segments of the adult population and the impact of limited literacy on their employment and well-being. The real challenge will be to serve people who *can read*, but not well enough to function fully in the workplace and as members of society. Reaching this large group will require drawing people to education and training, and removing the stigma attached to adult schooling. It will also involve creating opportunities for adults to build learning into their lives, for employers to build learning into the workplace, and for other social institutions (e. g., libraries and medical centers) to build learning into everyday life.

In the long term, an integrated, nationwide learning system that reaches learners throughout their lifetime needs to be developed as part of the Nation's literacy policy. We are a long way from creating an interconnected and integrated system of K-12 education, adult education, vocational and technical education, higher education, and training, but technology, particularly telecommunications, is helping to link institutions and programs in new and important ways. Congress may wish to enlist telecommunications, improved learning and management tools, and information systems to create a comprehensive system for adult literacy.