CHAPTER 2

CHAPTER 1 AND THE USE OF EDUCATIONAL TECHNOLOGY

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INTRODUCTION

Chapter 1 of the Education Consolidation Improvement Act of 1981 (ECIA) is the largest federally funded elementary and secondary education program.* The primary goal of the program is to provide supplemental educational and related services to educationally disadvantaged children who attend public or private schools in low-income areas. ** 1 Approximately 4.8 million children receive Chapter 1 services. Seventy-seven percent of these students attend elementary schools (preschool through grade 6). At both elementary and secondary levels, instruction is provided in reading, mathematics, and language arts.

Most of the provisions of the Chapter 1 legislation were originally contained in Title I of the Elementary and Secondary Education Act, which was passed by Congress on April 11, 1965, and amended several times thereafter. The program was established because Congress recognized that educationally disadvantaged children who attend schools in low-income areas have special educational needs which cannot be met by regular education programs, but the State and local education agencies (SEAs and LEAs)

^{*} Of \$17.8 billion appropriated to Federal education programs in FY86, approximately \$3.5 billion went to Chapter 1.

^{**} Children who are eligible for services attend schools in areas that are considered to below-income relative to the average income of the local education agency.

^{1.} Local education agencies receive Chapter 1 funds through the basic grant program. State education agencies are responsible for administering Chapter 1 programs for handicapped, migrant, neglected, or delinquent children. The State agencies also receive administrative grants, which are "... equal to the greater of 1 percent of the State's Chapter 1 allocation or \$225,000 per State, to help them meet their program responsibilities." Wayne Riddle, "Education For Disadvantaged Students: Federal Aid,^N Issue Brief IB81142 (Washington, DC: U.S. Congress, Congressional Research Service, Education and Public Welfare Division, Apr. 10, 1986).

that serve such areas may not have the financial resources to provide' these services. Congress specified that funds be used only to provide compensatory and/or remedial instruction: the services these children receive must "supplement, but not supplant" their regular educational program.²

In 1981, Congress restructured Title I to reduce administrative burdens of reporting and regulatory requirements and "to free the schools of unnecessary Federal supervision, direction and control."³ The new provisions of the Chapter 1 legislation gave States more freedom to design and administer programs. Further flexibility in carrying out programs was legislated in 1983, when technical amendments to the law were passed.

A recent U.S. Supreme Court decision significantly affects some Chapter 1 program services. On July 1, 1985, the Court, in the case of Aguilar v. Felton, ruled unconstitutional the <u>method</u> of providing Chapter 1 services to eligible children who attend nonpublic sectarian schools (approximately 4 percent of all Chapter 1 students). Approximately 78 percent of these children received instruction from public school teachers on the premises of the nonpublic sectarian schools. According to the decision, this method observing students led to excessive entanglement of Church and State. As a result, LEAs now provide Chapter 1 services to nonpublic sectarian students, where

^{2. &}quot;A State educational agency or other State agency in operating its State level programs or a local educational agency may use funds received under this chapter only so as to supplement, and to the extent practical, increase the level of funds that would, in the absence of such Federal funds, be made available from non-Federal sources for the education of pupils participating in programs and projects assisted under this chapter, and in no case may such funds be so used as to supplant such funds from such non-Federal sources." Public Law 89-10.

^{3. &}quot;The Congress . . . finds that Federal assistance [to meet the special educational needs of disadvantaged children] will be more effective if education officials, principals, teachers, and supporting personnel are freed from overly prescriptive regulations and administrative burdens which are not necessary for fiscal accountability and make no contribution to the instructional program." Public Law 89-10.

feasible, in one or more of the following ways: in public schools, at neutral sites, in mobile vans, or through the use of audio or visual broadcasts and/or computer assisted instruction which allow LEAs to deliver structured services without requiring the presence of public school staff n the premises of the non public sectarian school.⁴

EARLY USE OF TECHNOLOGY IN CHAPTER 1

Since 1965, schools have used some of their Title land Chapter I funds to purchase technology. In the 1960s, hardware on "the cutting edge" included overhead projectors, tape recorders, television sets, tachistoscopes (devices similar to film projectors that helped build students' vocabulary), and reading machines, which magnetically "read" vocabulary and mathematics flash cards. The infusion of Federal funds allowed schools to buy the new equipment, but little effort was expended to find instructive and effective ways to use it. Thus, much of the equipment sat idle in classrooms or was left in boxes and never unpacked.⁵

The first CAI programs entered the Nation's schools about the same time as teaching machines. For example, in 1965, four public school systems, including New York City and Philadelphia, implemented CAI systems.⁶ Using mainframe computers with terminals, the CAI programs were designed to provide reading and mathematics instruction to elementary school students.

^{4.} For more information, see David Ackerman and Wayne Riddle, "The Implications of <u>Aguilar</u> v. <u>Felton</u> for The Provision of Title l/Chapter 1 Assistance to Nonpublic Schoolchildren," (Washington, DC: U.S. Congress, Congressional Research Service, Aug.30, 1985).

^{5.} For more information see National Advisory Council on the Education of Disadvantaged Children, <u>Second Report</u> (Washington, DC: U.S. Government Printing Office, 1966). Washington Research Project of the Southern Center for Studiesin Public Policy and the NAACP Legal Defense and Education Fund, Inc., <u>Title Iof ESEA: Is It</u> Helping Poor Children? (Washington, DC: 1969).

^{6.} For more information see Beverly Hunter, 'Computer Literacy: 1949-1979," <u>Computer Literacy</u>, Robert J. Seidel, et al., (eds.) (New York: Academic Press, 1982), pp. 33-47. See also, Carol Hargan and Beverly Hunter, <u>Instructional Computing: Ten</u> <u>Case Studies</u> (Alexandria, VA: Human Resources Research Organization, 1978).

Federal funds not only supported the early research and development (R&D) of these programs, but also their implementation in schools serving educationally disadvantaged students. A 1982 OTA report found that R&D projects funded by the National Science Foundation and the Office of Education had a major impact on the state of the art in computer-based learning and teaching. The study also found that "... the focus of the Elementary and Secondary Education Act on the disadvantaged resulted in the development and implementation of high-technology systems that are effective in providing such students with basic skills."⁷

One of these early CAI systems was developed by the Computer Curriculum Corporation (CCC). It has been evaluated extensively with a wide variety of students, including disadvantaged students. A 5-year longitudinal study determined that the CCC drill and practice computer programs could improve the performance of compensatory education students in reading, mathematics, and language arts. When compared to a control group, students using the CAI materials made significant gains. Data from this study also indicated that the achievement gains could be maintained (even over summer vacations) and could be expected to increase steadily over several years of CAI participation. In addition to academic gains, students' interest and motivation increased and incidents of vandalism and truancy decreased.⁸

The effectiveness of some early CAI programs lent credence to the idea of using powerful computing devices to provide instruction. With the advent of microcomputers, this idea spread rapidly throughout the Nation% schools. According to data from a

^{7.} U.S. Congress, Office of Technology Assessment, <u>Information Technology and Its</u> <u>Impact on American Education</u> (Washington, DC: U.S. Government Printing Office, November 1982), p. 134.

^{8.} Ibid. For more information on this evaluation see M. Ragosta, et al., <u>Computer-Assisted Instruction and Compensatory Education: The ETS/LAUSDStudy</u>, The Final Report, #19 (Princeton, NJ: 1982); D. Jamison, et al., "The Effectiveness of Alternative Instructional Media: A Survey," <u>Reviewof Educational Research</u>, vol. 44, No. 1, 1974; and M.D. Roblyer, <u>Measuring the Impact of Computers in Instruction: A Non-Technical Review of Research for Educators</u> (Washington, DC: Association for Educational Data Systems, 1985).

National Center for Education Statistics (NC ES) Fast Response Survey, the number of microcomputers in schools "slightly more than doubled" from November 1980 to May 1982.⁹ Reports from a variety of sources cite five reasons for this "microcomputer revolution in America's schools:"^{,10}

- Computer advocates within and outside of school districts who saw computers as a way to revolutionize education persuaded district administrators to consider adopting computer technology.
- Pressure from parents who felt that their children must learn about computers to be successful was exerted on local and State education policy makers.
- Administrators saw that other schools were buying microcomputers, and they decided to "jump on the bandwagon."
- The educational reform movement which swept the country in the early 1980's emphasized student achievement and productivity. Computers were viewed as a means to increase both achievement and productivity.
- The result of the reform movement, in many cases, was new regulations. New demands were placed on teachers and administrators to manage

^{9.} U.S. Department of Education, Office of Educational Research and Improvement, National Center for Education Statistics, Instructional Uses of Computers in Public Schools, Fast Response Survey System Report No. 14 (Washington, DC: U.S. Government Printing Office, Spring 1982), p. 2.

^{10.} For more information see "Appendix A — Case Studies: Applications of Information Technologies" in U.S. Congress, op. cit.; and also see Robert K. Yin and J. Lynne White, <u>Microcomputer Implementation in Schools</u> (Washington, DC: Cosmos Corp., March 1984).

instruction. Computers, especially computer managed instruction programs, were viewed as a way to help meet those demands.

The factors which led to the adoption of computers in schools inevitably influenced the adoption of computers in Chapter 1 programs. A 1983 study for the Department of Education found that '... computers play a small but growing role in Chapter 1 instruction." The study reported that "on average" Chapter 1 students had the same access to computers as non-Chapter 1 students. However, actual computer use varied in significant ways. Chapter 1 students were more likely to use computers for remediation and less likely to use them for enrichment than were their non-Chapter 1 peers.¹¹

THE SPECIAL CASE OF AGUILAR V. FELTON

One month after the Supreme Court rendered its decision in the case of <u>Aguilar</u> v. <u>Felton</u>, the U.S. Department of Education issued the first set of nonregulatory guidance to SEAS on how to comply with the decision. These guidelines did not specifically mention computers, but said only that "a private school child [can] take Chapter 1 instructional materials onto private school premises for his or her use as part of the child% Chapter 1 program."¹² A second set of Department guidelines, issued 1 year later, suggested ways in which CAI might be able to "withstand judicial scrutiny" and be used as a remedy to the decision. To date, there have been no court cases in which the legality of using CAI as a remedy has been tested.

^{11.} For more information see Elizabeth R. Reisner, The Use of Computers In instruction Supported Under Chapter 1 of the Education Consolidation and Improvement Act (Washington, DC: U.S. Department of Education, September 1983).

^{12.} U.S. Department of Education, <u>Guidance on Aguilar v. Felton and Chapter 1 of the Education Consolidation and improvement Act Questions and Answers</u> (Washington, DC: August 1985), p. 17.

The use of CAI as a remedy to <u>Aguilar v. Felton</u> raises important legal issues. CAI equipment placed on the premises of the religiously affiliated private school, under certain conditions, could lead to excessive entanglement of Church and State. ¹³ T h e 1986 Department guidelines list the following five criteria for placing the CAI system on the premises of the nonpublic sectarian school:¹⁴

As with all Chapter 1 programs serving private school children, the CAI program must be under the LEA's direction and control. <u>On-site review</u> by public school officials must be limited, however, to such things as the installation, repair, inventory, and maintenance of equipment.

Private school personnel may be present in CAI rooms to perform limited noninstructional functions such as to maintain order, to assist children with equipment operations (such as turning the equipment on and off, demonstrating the use of the computers, and accessing Chapter 1 programs), and to assist with the installation, repair, inventory and maintenance of the equipment.

Neither public nor private school personnel may assist the students with instruction in the CAI room. Public school personnel may, however, assist by providing instruction through computer messages, by telephone, or by television.

Access to the computer equipment and the rest of the program must be limited to Chapter 1 eligible children.

Equipment purchased with Chapter 1 funds may not be used for other than Chapter 1 purposes.

To meet this set of requirements, some school districts have purchased or leased distributed CAI systems. These systems comprise a mainframe or host computer located at an LEA-owned site that are linked to terminals located at the religiously affiliated private schools. Terminals connect to the mainframe computer via a telecommunications network of dedicated cables, regular telephone lines, or microwave link(s).

^{13.} The Supreme Court has previously examined the constitutionality of public subsidies of the cost of nonpublic sectarian education, especially the cost of instructional services. See <u>Meekv</u>. <u>Pittenger</u>, 421 U.S. 439 (1975), and <u>Wolman</u> v. <u>Walter</u>, 433 U.S. 229 (1977); and Also, see Ackerman and Riddle, op. cit.

^{14.} U.S. Department of Education, Additional Guidance on Aguilar v. Felton, and Chapter 1 of the Education Consolidation and Improvement Act (ECIA) Questions and Answers (Washington, DC: June 1986), pp. 8-9.

There are some advantages to using these distributed CAI systems to serve students who attend nonpublic sectarian schools. First; it is possible to track and record student performance with the management component built into the system software. Thus, a Chapter 1 teacher can monitor students' progress and the LEA can send a print-out of the students' work to their regular classroom teachers. This may enhance coordination between the Chapter 1 program and the private school. Second, because only eligible students are given a password to access the CAI program, LEAs do not have to be concerned about compliance with Federal regulations regarding the use of Chapter 1 funds. Third, neither teachers nor students can modify the CAI programs. Thus, LEAs do not have to take extra steps to prevent sectarian schools from diverting the technology for religious purposes.

There are also several disadvantages to using CAI as a remedy. If students are using "dumb" terminals, they are likely to encounter delays between the time they enter an answer into the computer and the time the computer responds to it. * The time it takes to process messages has at least two effects on the instructional process. First, students may lose interest in the subject matter if they have to wait too long for a response. The computer is no longer providing them with instant feedback, a feature that is often said to be the key to the technology's ability to help motivate disadvantaged students. Second, because graphics require large amounts of data to be sent from a mainframe to a terminal, elaborate graphics are generally not found in distributed systems. Graphics capabilities are another feature of the computer technology that make it so appealing as an educational tool.

While delays can be prevented and more complex graphics can be displayed if districts purchase "smart" terminals, which are essentially stand alone computers that

This is because the student% message must travel from the terminal over cables, telephone lines, or microwaves to an input buffer in the mainframe. The message remains in that buffer until the mainframe is ready to process it. Messages are processed on a first-come, first-serve basis. After the message is processed, it is sent to an output buffer and then back to the student% terminal.

allow entire programs to be downloaded from the mainframe, there are other limitations to these CAI systems. For example, software programs can be changed <u>only</u> by the vendor. This limits the inherent flexibility of the computers a multipurpose tool.

The costs of distributed CAI systems maybe prohibitive for many LEAs. Districts must either purchase or lease the following equipment and services: hardware, which includes the mainframe/host computer, dumb or smart terminals, modems for communication between terminals and a mainframe; software; a telecommunications link, the cost of which will vary depending upon the type of linkage; the installation of the hardware, software, and telecommunications links; hardware and software maintenance; and training — for both the public school teacher at the LEA site and for "monitors" on the premises of the religiously affiliated private school. * The costs for just the hardware (mainframe, terminals, and modems) and software range from \$80,000 to \$185,000.**

Another disadvantage of this approach is that Chapter 1 teachers cannot easily communicate with the students at these sites. Districts can purchase electronic or telecommunications systems to facilitate that communication, such as electronic mail, telephone hook-ups, or bi-directional television, at an additional expense. Without these peripheral devices for communication, the Department acknowledges that it is not clear if CAI alone will meet the equitability requirements of Chapter 1:

When both public and private school children are receiving the same CAI service, the equitable services requirement of Chapter 1 is met. When CAI is being provided to private school children while public school children are receiving direct instruction from a teacher, the question of equitability is more difficult.¹⁵

Training costs should be minimal since neither public nor nonpublic school personnel can provide instruction to students who attend religiously affiliated private schools on the premises of those schools.

^{**} One State **is** considering placing a mainframe **inits** cooperative computer center. Districts throughout this State **would** have access to the system. The fees for this service would be prorated. According to the coordinator, such a cooperative system would give this State the highest proportion of nonpublic students served in the Nation. 15* According to the Departmentfs nonregulatory guidance, "this may be especially true in a year after the computers were purchased since, after the initial purchase of

The reason the question of equitability is more difficult is that private school personnel are not allowed to assist students with instruction in the CAI classroom in the private school building. Because the functions that nonpublic sectarian staff can perform are so limited, the quality of services nonpublic school students receive may not be comparable to those given to public school students.¹⁶

PRESENT USE OF COMPUTERS IN CHAPTER1

A Statistical Profile¹⁷

While not all Chapter 1 programs use computers, approximately 60 percent of public school Chapter 1 teachers report that they use computers to teach their Chapter 1 students. (See Figure 2-1) Of the more than 3 million Chapter 1 elementary school students in the nation, about 2.4 million (71.6 percent) have Chapter 1 teachers who use

equipment, CAI normally provides services at a cost less than the typical Chapter 1 program." However, the Department permits LEAs to spread out the cost of purchasing a CAI system over a period of years "for the purpose of meeting the equitable cost requirement," U.S. Department of Education, <u>Additional Guidance-on Aguilar v. Felton,</u> and Chapter 1 of the Education Consolidation and Improvement Act (ECIA) Questions and Answers, op. cit., p. 10.

^{16.} The Department% guidelines state, "if the CAI alone does not provide this equity, the LEA may make up the difference by offering additional services, such as tutorial centers of appropriate summer school programs. Of course, private school children may choose to participate in only a portion of the services offered, and the offer may still be considered equitable," U.S. Department of Education, Additional Guidance on Aguilar v. Felton, and Chapter 1 of the Education Consolidation and Improvement Act (ECIA) Questions and Answers, op. cit., p. 11.

^{17.} The analysis in this section is based on two principal sources of data: (1) original data from the 1986 National Surveyof ECIA Chapter 1 Schools conducted by the Westat Corporation for the U.S. Department of Education's 1986 National Assessment of Chapter 1, and (2) original data from the 1985 National Survey conducted by the Center for the Social Organization of Schools at Johns Hopkins University, under the direction of Henry Jay Becker, as well as summaries found in the "Instructional Uses of School Computers" newsletters, issues 1-3, 1986.



FIGURE 2-1. -- TEACHERS* USING COMPUTERS IN INSTRUCTION

*In schools receiving chapter 1, State, or other compensatory education or special education services. SOURCE: Westat Corp., National Survey of ECIA Chapter 1 Schools, 1986

FIGURE 2-2"



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SOURCE: Westat Corporation, National Survey of ECIA Chapter 1 Schools, 1986.

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computers. Of some 960,000 Chapter 1 middle/high school students nationwide, 540,000 (56.1 percent) have Chapter 1 teachers who use computers. (See Figure 2-2) The degree to which Chapter 1 teachers use computers depends upon a number of factors:

Concentration of Poverty

Chapter 1 teachers working in high schools where more than 40 percent of the students are eligible for free or reduced price lunches are less likely to use computers than teachers working in other high schools. In elementary schools, however, the use of computers by Chapter 1 teachers increases with the school% concentration of poor students; but in the very poorest elementary schools — where more than 75 percent of the children are eligible for free lunches — the percentage of Chapter 1 teachers using computers is lower than in other schools. (See Figure 2-3)

Subject Matter

Chapter 1 teachers of reading, language arts, and mathematics are about equally likely to use computers with their students: 62 percent of those who teach mathematics, 59 percent of those who teach reading, and 57 percent of those who teach language arts use computers. However, only 40 percent of Chapter 1 teachers who teach English as a second language (ESL) along with other subjects use computers, and only 22 percent of those who teach ESL exclusively use them.

Academic Achievement

Students who receive Chapter 1 services are usually performing below grade level. There is a slight difference in the likelihood of computer use in mathematics and reading that appears to be related to the achievement level of the Chapter 1 students. Teachers who use computers have a higher proportion of students who score below the 50th percentile in these subjects than teachers who do not use computers. (See Figure 2-4)

FIGURE

CHAPTER 1: COMPUTER USE AND ELEMENTARY SCHOOL POVERTY LEVEL





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FIGURE 2-4





This finding may be related to the finding that teachers believed that computers benefit below average students more than average or above average students. This perception was shared by a higher percentage of teachers as the concentration of Chapter 1 students in the school increased. Both Chapter 1 and non-Chapter 1 teachers believe computer use raises students' enthusiasm for subjects in which the computer is used.

Urbanicity

Chapter 1 teachers who teach in rural schools are more likely to use computers than their counterparts in urban schools. Sixty-one percent of Chapter 1 teachers in rural schools use computers, while only 53 percent of Chapter 1 teachers in urban schools use them. Perhaps Chapter 1 teachers in rural areas use computers more because they have more access to them, since both classes and schools tend to be smaller in rural districts than in urban areas.

OTA Survey of Chapter I Directors

The statistical data provide an important overview of the some of the factors that influence computer use in Chapter 1 programs. OTA also surveyed State Chapter 1 directors and interviewed local project officials to gain a fuller picture.

Because State coordinators approve LEA requests for the purchases of instructional equipment with Chapter 1 funds, their views about the use of computers in the program can be very informative. To gain abetter understanding of those views, OTA sent a one-page survey questionnaire in September 1986 to all 50 State Chapter 1 coordinators and the coordinator for the District of Columbia.* In addition, OTA staff contacted each coordinator in December 1986 for the purpose of clarifying or expanding information provided in the questionnaire and to pose additional questions about the use of

In reporting responses to the survey, the term State is used generically to categorize the 50 States and the District of Columbia.

computers. The response rate to the mail and telephone surveys was 100 percent. In exchange for their replies, the State coordinators were granted complete confidentiality. The results of the survey appear below.

The Amount of Money Spent on Hardware and Software

Every State coordinator reports that Chapter 1 funds have been used to purchase and/or lease computer hardware and software since 1980. However, not every coordinator knows how much money was spent, because States are not required to collect and report information about the use of Chapter 1 funds for the purchase of computers. In fact, several State coordinators contacted local district Chapter 1 directors to answer the OTA questionnaire.

Even though State coordinators provided information on expenditures, many described their responses as "very rough estimates." While it is important to remember these qualifications, the figures can provide a sense of the size of the expenditures for computer hardware and software. Thirty-nine coordinators provided estimates of the amount spent to purchase and/or lease computer hardware and software for Chapter 1 programs from 1980 to 1985. Over this 5-year period, these 39 States spent approximately \$89 million. This figure insignificant: it indicates that there is already a market for hardware and software in compensatory education programs.

Some vendors and publishers are aware of this market and are actively pursuing it. Three State coordinators mentioned that they feel pressure from vendors to purchase computers. One coordinator observed: "Right now, we have a bunch of companies who

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^{**} It is important to point out that these views may not coincide with the views of local district Chapter 1 educators. The U.S. Department of Education National Assessment of Chapter 1 is gathering extensive information from interviews with district Chapter 1 coordinators and teachers and from case studies of local programs; thus it can be expected that local views will be represented.

In the course of the OTA State survey, several respondents attached information about computer use in Chapter 1 from local district reports in their State or provided contacts at the local level. Thus OTA staff were able to gain a fuller understanding of actual computer use.

are trying to sell products to educators. Educators should be driving this whole marriage between education and technology. They should be saying, 'here are some problems that need to be solved.' [Now], we have people [vendors] who are dumping products they couldn't sell to businesses on schools. Yet we're one of the largest potential markets.~

Few coordinators provided details about spending patterns in the last 5 years. But from their comments, it appears that spending patterns in Chapter 1 programs for computer hardware and software reflect national trends: between spring 1983 and spring 1985, the number of computers in use in schools jumped from about 250,000 to over one rnillion.¹⁸

From data provided by 36 States (including 34 of the aforementioned 39 States), OTA estimates that States now spend, on average, 1.6 percent of their Chapter 1 budget to purchase and/or lease computers. The percentage of each State's budget spent on computer technology ranges from 0.02 percent to 9.5 percent. In addition, two State coordinators who did not provide budget figures, indicated that their States have a policy which limits the amount of Chapter 1 funds for computer purchases to 2 percent and 5 percent, respectively.

According to data provided by 37 States, Chapter 1 funds will continue to be used for the purchase of computer hardware and software in the 1986/1987 school year. From the various State figures and estimates provided, OTA projects that 37 States will spend approximately \$21 million in the 1986/1987 school year. However, it should be noted that 17 of those 37 States plan to spend less money on the technology in the 1986/1987 school year than they have in the past, while ten States plan to spend more money, and 10 States plan to spend the <u>same amount</u> of money. Two coordinators reported that some of the monies spent on computers would be used to purchase systems that would serve as a remedy to the <u>Aguilar</u> v. Felton decision. One of these coordinators cited this

^{18.} For more information see Henry J. Becker, <u>[instructional Uses of School -Computers</u>, Reports from the 1985 National Survey, (Baltimore, MD: Johns Hopkins University, Issue No. 1, June 1986), p. 1.

particular purchase as the reason for the increase in the amount of money spent on computers this year.

The Uses of Computers

In Chapter 1 programs, computers have been purchased for administrative purposes, instructional purposes, or both. In 44 States, Chapter 1 programs are using computers for <u>both</u> instructional and administrative purposes. Of the seven States which reported using computers solely for instructional purposes, five did, in fact, reference ways in which computers are used for administrative purposes. There is good reason for this overlap.* Many administrative uses are linked directly to the instructional program in the actual provision of services to students. Computers are used to help teachers diagnose and develop individual plans for students, to keep records, and to track the progress of those students. Coordinators believe that the technology allows teachers to spend more time providing direct instruction to students. Notes one coordinator: "... teachers don't have to spend time on pencil and paperwork [anymore]."

In the future, sophisticated diagnostic/prescriptive software packages might be developed, further blurring the distinction between administrative and instructional uses.

Administrative Uses Of Computers

The most frequently cited administrative uses of the computer were tracking student progress and record keeping. (See figure 2-5) When State coordinators listed other administrative uses, they often mentioned that computers are used for report preparation, for budgeting and accounting, and for evaluation purposes to select eligible

The respondents also wanted to demonstrate that they were not using the Chapter 1 funds they receive to administer the program to purchase computers. (The State's administrative allocation is the greater of two amounts — 1 percent of the State's total allocation or 225,000.) According to one coordinator, 'computers can be used for administrative purposes, but must be purchased and used primarily for educational purposes."

FIGURE 2-5



SOURCE: OTA Survey of State Chapter 1 Coordinators"

students and target schools. Computers are also used to compile and analyze data (especially student performance data and survey data), to prepare diagnoses and prescriptions for individual students, to assess program needs, to review software, and for word processing. These applications are very closely linked to the instructional component of Chapter 1.

Computers are also being used to compile, analyze, and report data to other Federal, State, and local agencies. While not many State Chapter 1 offices are using computers for these purposes, several State coordinators expressed great interest in the potential for technology to enhance coordination among programs at all levels. One State uses computers to compile performance data and report it to a Technical Assistance Center. Another uses them to determine mobility and service patterns for planning and reporting in the Migrant Education Program. This computerized system "transfers educational information when a child moves from one area to another." Finally, one State has a computerized evaluation system to report data from LEAs to the SEA. This system was installed in 1985 as a result of recommendations made by the State's task force on evaluation. According to the coordinator, the system was not difficult to implement. The coordinator believed that LEA, SEA, and Federal databases could be linked via computer to simplify reporting procedures.

Administrators and teachers can benefit from advanced administrative applications. In the future, computers might be used to enhance coordination between services provided under Chapter 1 and other special programs, e.g., Special Education programs and Bilingual Education programs. Currently, computers help enhance coordination between Chapter 1 programs and regular classroom activities. For example, in some school districts, regular classroom teachers receive a printout of work students have completed in their Chapter 1 class as soon as the Chapter 1 class period ends.

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Instructional Uses of Computers

Every State coordinator reported that computers are used for instructional purposes in Chapter 1 programs. " On the questionnaire, instructional uses were characterized as drill and practice and/or problem solving in reading and/or mathematics. In addition, the category of "other" was provided. Coordinators were asked to check all items that applied.

All States reported using computers for drill and practice in reading and mathematics. Thirty-five of the States also reported using computers for problem solving activities with their students. Ten States reported other instructional uses as well (See Figure 2-6); these uses include teaching writing skills and language arts, counseling students, and reporting to parents.

The finding that all States use computers for drill and practice for either mathematics or reading skills development is not surprising, since the first instructional software was principally designed for drill and practice. Much of the software available at this time still falls into that category. (See Figure 2-7) Only in the last few years has software aimed at developing students' higher order thinking skills been introduced. It is interesting to note the large percentage of States (69 percent) which reported using computers for problem solving with Chapter 1 students. In the past several years, many schools have taught students to program in LOGO and other languages as a way of improving thinking skills. Recently, 33 Chapter 1 sites have implemented the Higher Order Thinking Skills (HOTS) program, a computer-based compensatory education program that focuses on developing students' problem solving skills. According to Dr. Stanley Pogrow, the designer of the HOTS program, 'preliminary data indicate that the thinking skills approach can not only enhance thinking, but can also produce even greater substantial basic skills gains than traditional approaches for students in grades 4-6."¹⁹

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Chapter 1: Instructional Uses of Computers



Source: OTA Survey o f State Chapter 1 Coordinators.

FIGURE 2-7



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SOURCE: Based on data extracted from The Educational Software Selector (TESS) Database, May 1986, personal communication, Bob Haven, Educational Products Information Exchange (EPIE), Water Will, NY. The Chapter 1 coordinators expressed differing views about the appropriate instructional uses of computers with disadvantaged children. Some felt that, because the purpose of the Chapter 1 program is to provide supplemental educational services to these targeted students, and because these students are deficient in basic skills, it is appropriate for them to use computers for drill and practice in their Chapter 1 classes, especially if coordinators insisted that Chapter 1 students must also master problem solving skills as well. They contended that basic skills and higher order thinking skills are inexorably linked. Without teaching educationally disadvantaged students higher order skills along with basic skills, They will never perform at or above their grade level. These educators fear that the Chapter 1 students will remain disadvantaged because they will not be able to solve complex problems. If computers can help teach problem solving, these coordinators stated, then Chapter 1 students should have access to this use of the technology.

The Use of Computers by Limited English Proficient Students in Chapter 1*

In contrast to the use of computers for instruction among all chapter 1 students nationwide, only 13 coordinators reported using computers are used for instruction in States that have a large population of limited English proficient (LEP) Chapter 1 students. Fifteen States said they do not use computers with their LEP Chapter 1 students, and 13 coordinators said they did not know if computers are used in Chapter 1 programs that serve LEP students. In addition, 10 coordinators mentioned three reasons why the question was not applicable to their States: (1) because "no LEAs have large populations of LEP students;" (2) because the regulations for Chapter 1 do not require States to identify students on the basis of their proficiency in English ("LEP students are

^{19.} Dr. Stanley **Pogrow**, University of Arizona, College of Education, personal communication, Mar. 3, 1987. **Pogrow** also reported that at one HOTS site, 10 percent of the Chapter 1 students were rediagnosed as "gifted" after 1 year in the program. At another site, 36 percent of the Chapter 1 students made the school% honor roll.

For a more complete discussion of this topic, see Chapter 30fthis report.

not eligible for Chapter 1 based on LEP status only"); or (3) because the State does not distinguish between LEP Chapter 1 students and non-LEP Chapter 1 students.

In the 13 States where computers are used with LEP Chapter 1 students, the coordinators indicated that instruction in reading, writing, mathematics, and language arts is provided. They suggested that the LEP students need to develop their language skills and that drill and practice programs can help to reinforce those skills. One coordinator believed that computers are especially helpful to LEP students in class because "somecan read better than they can understand oral language."

Computers are used in a variety of instructional settings to teach LEP Chapter 1 students, including in classes for English as a second language. One coordinator said that many LEP students are being exposed to computers in State bilingual education programs if they are not using computers as part of their Chapter 1 instructional services. Two coordinators in western states said that computers were used in Chapter 1 programs which served a large proportion of Native American students.

The Use of Computers As a Remedy to the Aguilar v. Felton Decision

Less than half of the States (23) have used or are using Chapter 1 funds to purchase computers as a remedy to the <u>Aguilar</u> v. <u>Felton</u> decision, ^{*} while four additional States plan to do so in the future. Among these 27, five States use or plan to use district or statewide computer networks, two States plan to use mobile vans, and eight plan to use both vans and networks. In addition, six of these 27 States suggested other uses or planned uses in addition to the mobile vans and/or networks. These other methods

^{*} Two of the remaining 28 States cannot provide services to nonpublic school students directly owing to provisions in their State constitutions. Third party organizations in those States receive a percentage of the SEAS allocation to provide services to eligible nonpublic school students. This arrangement is known as abypass.

include using technology in public school programs to which the private school students are bused, in CAI labs at neutral sites in programs which enable parochial school students to take computers home with them.

In States which are using computer-based instructional systems to serve Chapter 1 students on the premises of nonpublic sectarian schools, coordinators are very concerned about equitability. In fact, it appears that many States are restricting or preventing the use of computer-based instruction because of that concern. Coordinators stated that 'the computers are replacing teachers in the nonpublic schools."

As a result of the Supreme Court's decision, neither public nor private school teachers are allowed to provide instruction during Chapter 1 classes on the premises of the nonpublic sectarian schools even when the children are using the computers to receive those services. In States using various configurations of computer systems to serve some nonpublic school children, nonpublic school staff supervise the students receiving Chapter 1 instruction. 'Nonpublic school staff refers to parents, volunteer aides, secretaries, or library aides. The staff are trained to use the computers and to monitor the classrooms. Many coordinators said that the computer programs themselves are often very limited: 'computer grogram.'' Thus, according to one coordinator, "the CAI programs may provide very shallow instruction. But it is better than nothing according

Despite his enthusiasm, the coordinator said that he does not see the program spreading: 'People are still fighting for alternatives."

^{**} One coordinator was very enthusiastic about the benefits of such a 'take-home" program which is being tested in his State. The following is his description of the program:

Kids and parents go to a neutral site for one evening to learn about CAI and to learn how to hook up the computer to their television set. They have the computer for up to six weeks. Parents provide supervision. [Sometimes] the public school person will make home visits. More often, they are in contact with parents over the phone. [After six weeks,] the kids and parents return to the neutral site for more instruction. . . The program increases parental involvement, and it makes the instruction more meaningful and exciting.

to the nonpublic school administrators." Other coordinators echoed that opinion:

I don't believe the technology will be as effective as teachers. But we're faced with a choice: either we serve the kids with technology or we don't serve them at all.

Computers aren't really complete remedies. You need a good teacher in the classroom. The computer reinforces what the teacher has taught.

While some coordinators were not optimistic about the present state of instructional software, others believed that future developments of both hardware and software may be able to provide a greater degree of instruction and tutoring geared to students' needs. Three States are trying to use technology as an alternative means of "bringing" teachers into the nonpublic sectarian school% Chapter 1 CAI lab. One State uses an audio telecommunications network which allows students to communicate with teachers while they are using the terminals. One State currently uses and another State is about to install "e-mail" — electronic mail. This enables students and teachers to communicate with each other via computer. To the coordinators in these and in other States which use CAI in Chapter 1 classes in nonpublic schools, finding ways to improve this method of delivery is very important because networked computers might become the remedy of choice in school districts that can afford to purchase them. According to one coordinator, '[nonpublic] school parents are resistant to having their children bused to neutral sites or to the public school; they are not resistant to CAI."

State Technical Assistance

States provide a variety of technical assistance, including teacher training, to LEAs regarding the use of computers in Chapter 1 programs. In 15 States, teachers and administrators receive technical assistance and training from an educational technology consultant who is hired by or works in the State's Department of Education.²⁰ In another

^{20.} According to the <u>Electronic Learning</u> 1986 Annual Surveyof the States, every State has an office of educational technology or an educational technology specialist or consultant in the State's department of education. The degree of coordination between such offices or consultants varies and special programs like Chapter 1 varies from State

13 States, Chapter 1 offices within the SEA provide technical assistance and some teacher training on the use of computer-based technology at State and/or regional workshops.* There is some overlap between these groups: four additional States that offer statewide and/or regional workshops also work with a "State educational technology Three more States sponsoring such workshops also work with Chapter 1 consultant. technical assistance centers (TACS); in one State, teachers and administrators receive assistance in workshops and from vendors, and in another State assistance is provided by an educational technology consultant and/or by vendors. It is important to note that those states which provide technical assistance to teachers and administrators in workshops or in conjunction with a State educational technology consultant are least likely to rely on TACS, vendors, or LEAs to provide additional assistance. In several other States, teachers and administrators received technical assistance and some training from a combination of sources: from TACS, from vendors, or from LEAs.²¹ Only two States relied upon just one of these sources for assistance. Only one coordinator indicated that the State had no formal means of providing assistance or training to Chapter 1 teachers or administrators regarding the use of computers.²²

to State. The survey noted that 25 States make 'special efforts to provide computer access to Chapter 1, handicapped, or limited English proficient students. Jack L. Roberts, Editorial Director, <u>Electronic Learning</u>, personal communication, September 1986; and Fran Reinhold, 'Computing in America: Electronic Learning's Annual Survey of the States, "Electronic Learning, vol. 6, No.2, October 1986, p. 28.

^{*} In one of these States, some Chapter 1 teachers receive training via a closed circuit television network which broadcasts to 20 regional education centers.

^{21.} Approximately 38 percent of all districts have full-time or part-time paid computer consultants; Reinhold, op. cit., p. 28.

^{22.} A 1983 survey of State coordinators about the use of computer technology in Chapter 1 reported that coordinators said "the subject should be included in general technical assistance training programs." They gave some priority, but not the highest priority, to "this subject in relation to the overall technical assistance needs for administering Chapter 1 programs. In addition, they ranked the types of technical assistance most likely to be useful in the following order: (1) "an SEA-sponsored conference and/or regional technical assistance meetings;" (2) "consultant services;" (3) "a network for disseminating information on effective practices;" and (4) a conference sponsored by the State Department of Education. For more information see R.F. Cheuvront, "Information on the Use of Computers in Chapter 1," Colorado Departmentof Education, unpublished survey, January 1983. Also see Reisner, opt. cit., p. 20.

Two additional States provided assistance through computer consortiums. In one of these States, the consortium, which receives funding from the private sector as well as the State, works in conjunction with the State% regional educational service centers to provide assistance and training to all teachers and administrators including those who work in Chapter 1 programs. In the other State, a technology information program and a computer consortium center were established 3 years ago. The center% purpose is to train teachers and to develop software. The SEA does not run the center; it only facilitated its start. According to the coordinator, "the center is completely self-supporting." Districts pay a fee to belong to the consortium and to receive services.

While the two State consortia provide in depth training and assistance, the length and quality of assistance and training Chapter 1 teachers and administrators receive varies widely from State to State. In one State, teachers and administrators go to one of nine "high-tech" labs which have a variety of computers to receive training, software, and manuals. Some States hold Chapter 1 conferences for teachers and administrators annually or biannually and devote some time to computing at these conferences.* The focus on computing in the sessions may be on administrative/management applications (for district coordinators and/or for teachers), instructional applications, or both. Some State coordinators admitted that it is difficult for them to arrange workshops on instructional uses of computers. They rely on vendors, TACS, or LEAs because, "State-level people are compliance oriented, and people at the local-level are instructionally oriented." Some States hold workshops on management applications for administrators and encourage teachers to attend classes on computers at 'Chapter 1 Summer Institutes"^N or at in service activities during the school year. In many States, attendance at classes or workshop sessions on computing is optional. Despite the efforts States have made to

^{*} In one State that sponsors an annual conference for special education teachers and Chapter 1 teachers, the coordinator said the amount of time allotted to discussing instructional and administrative use of computers has increased from a 1 hour session 3 years ago to 40 percent of the conference today.

provide training to Chapter 1 teachers, coordinators reported that the need for training is still great. According to one coordinator, "there is a need for <u>massive</u>, wholesale, consistent teacher training."

In addition to providing training and technical assistance to Chapter 1 administrators and teachers, some State Chapter 1 offices oversee software evaluation, dissemination, and development efforts. In one State, a computer-managed instructional software package and its documentation, developed by a Chapter 1 teacher in the State, has been made available to all LEAs. This State and a few others provide LEAs with public domain software for their Chapter 1 programs. Some coordinators stated that it is still difficult to find software that meets the needs of Chapter 1 students. One coordinator says, "Our State% biggest stress is locating appropriate software."

State Policies for The Use of Computers in Chapter 1 Programs

More than twice as many States, (22), have policies regarding the use of computers in Chapter 1 in the 1986 OTA survey as did those in a previous study in 1983(10).²³ The " following factors may have led to this increase: (1) the increase in the number of computers in schools in general; (2) a strong interest in managing technology on the part of State agencies; (3) a desire on the part of Chapter 1 administrators not to repeat mistakes made in the early days of Title 1 when "a lot of equipment was purchased but never uncrated;" and (4) the <u>Aguilar v. Felton</u> decision, which has heightened concern about program compliance.

State policies range from a one page list of questions for district coordinators that provide a framework for planning to documents of several pages in length which state explicitly how computers should be used. Many of these policies, regardless of length, require districts to show how they will plan for the introduction of the technology, how computers will help meet the program's instructional objectives, and how teachers' will

^{23.} Cheuvront, op.cit.

be trained to use the computers. For example, one State requires a "written justification [for the use of the equipment] before the purchase is approved" Another coordinator said, "We do not endorse the purchase of CAI equipment without an instructional design and a plan to provide in service training to teachers. [Furthermore,] the number of students must justify the purchase." The rigorous nature of policies like these reflects many administrators' commitment to assure that computers will be effectively used.

Many of the State policies contain regulations regarding the use of Chapter 1 funds to purchase and/or lease computer hardware or software. Several States have set a limit on the percentage of an LEAs budget which can be expended on computers. Other State coordinators think such limits are unnecessary: "if 50 percent of a project's allocation goes toward the purchase of computers, that may be o.k. if they can justify the purchase via needs assessment." Seven State% policies regarding the use of Chapter 1 funds to purchase computers reflect section 555(c) of the Chapter 1 legislation, which states that Chapter 1 funds may only be used to benefit Chapter 1 students.²⁴

Other policies apply general provisions in the Federal regulations to specific uses. For example, one State% policy reflects the "supplement, but not supplant" provision of the legislation: "neither the Chapter 1 computers nor the time spent by students in a Chapter 1 computer-assisted program may count toward meeting State requirements of computer literacy." A few States, which contend that the intent of the Chapter 1 legislation is to provide students with individualized instruction from a teacher, have policies specifically prohibiting computers from replacing teachers.

^{24. &#}x27;A local education agency may use funds received under this chapter only for programs which are designed to meet the needs of educationally disadvantaged students. . and which are included in an application for assistance by the State educational **agency.**" Public Law 89-10, sec. 555(C).

Finally, one State policy applies strictly to administrative uses of computers. This State with a large population of migrant students mandates that all migrant regional offices must use the same file program to maintain student data and to report to the State.

Evidence of Instructional Effectiveness

Research on the effectiveness of computer-assisted instruction in general spans almost two decades. Coordinators were asked if they were aware of any research studying the effectiveness of technology in Chapter 1 programs in their States. Ten coordinators responded positively to the question. They indicated that the results of research in their States varied. In some projects, students did show marked improvement. In others, the gains they made were not significant. According to one coordinator, the results of research conducted in his State showed that "students did not [make] significant gains as a result of computer assisted instruction. Their attendance and attitudes improved." Another coordinator found that '[owing to] variations in programs and in the ways in which they use computers, it is difficult to strictly credit [gains] to computer-based instruction." Wide variations in evaluation design, program operation, and types of data collected also make it difficult for State coordinators and others to assess the role CAI plays in increasing educational gains for Chapter 1 students.

Evidence of Cost Effectiveness

Despite the amount of money States have invested in computer technology, only 10 coordinators were aware of evidence suggesting that the use of computers in Chapter 1 is cost effective. Six of these States had evidence to suggest that fewer instructional aides are needed and that more students are served when computers are used in the program, two States reported that computers allow students to progress at a faster rate, and the

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remaining two States had evidence only pointing to the need for fewer aides when computers are used.

These coordinators' comments on the issue of cost effectiveness were mixed. One coordinator is "actively discouraging purchasing computers for drill and practice [because] it is very expensive." That State'ss coordinator said, "You can buy a workbook for 25 cents. A computer costs \$2,000." In contrast, another State coordinator agreed that computers were much more expensive for drill 'and practice than workbooks, but felt that the extra costs are justified because students' time on task is increased significantly. A third coordinator said that the use of technology should be more closely linked to cost effectiveness:

I detect the absence of cost-effectiveness criteria. The first year [a district invests in computer technology] is almost free. The vendors want in the door. After that, LEAs can't get continual funding. Plus, the copyright laws require schools to buy several copies of software.

What Do Computers Enhance? What Do They Replace?

Little consensus exists among coordinators about what computers actually enhance. The one area of general agreement is that computers help teachers improve the ways they manage their classrooms. Many coordinators believe that computers free teachers from tedious tasks. According to one respondent, computers increase 'the speed of management." Another coordinator noted, 'computers do not replace teachers. They 'replace' teachers where they belong — providing direct instruction to students." Finally, one coordinator said, "there is a valid use of microcomputers in district management of Chapter 1 programs and all instructional programs."

Almost every coordinator believed that computers enhance motivation. According to several coordinators, many Chapter 1 students who use computers are more motivated to do their work because the computer is nonjudgmental, it allows students to work at their own pace, it provides instant feedback, and it makes "seatwork" more interesting. Some coordinators also suggested that computers enhance students' self esteem: using such sophisticated machines enables educationally disadvantaged children to believe they are capable of reaching the same goals as their higher achieving peers.

At the same time, however, coordinators admitted that the motivational benefits of computer use are hard to measure empirically. Some coordinators wondered how long such benefits will last. Almost every coordinator agreed that it is difficult to assess the role computers play in increasing educational gains for Chapter 1 students.²⁵

Coordinators had different opinions about how computers should be used to maximize achievement gains. Many said that computers should be used strictly for skills reinforcement. 'Computers enhance reinforcement. They give students more-time to practice at their own pace while teachers provide small group instruction to other students." Other coordinators feel that using the computer solely for reinforcement restricts the power and the capability of the technology. According to one coordinator, "drill and practice is an easy out."

According to almost all of the coordinators, whether or not the technology enhances instruction is dependent upon several factors. As two coordinators noted:

In my experience, the advent of [computer based instruction] has been and can be beneficial to the program provided that it is carefully managed and monitored by LEAs and SEAS and that it relates to the educational program, that it is a supportive device to the program, and most important, that staff receive in service training six months to a year before the technology is put into the classrooms.

You just cannot purchase computers and hope they clothe job for you. There must be district-level teacher training programs which show teachers how the technology can be used to enhance coordination between the Chapter 1 classroom and the regular classroom. There must also be [some way] of evaluating software.

^{25.} Assessing the effectiveness of CAI is a very difficult problem. Researchers have employed a variety of methodologies in their attempts to measure gains in student achievement from computer based education. For more information on the methodologies and results of experimental studies see David Stern and Guy Cox, 'Assessing Cost-Effectiveness of Computer-Based Technology in Public Elementary and Secondary Schools," OTA contractor report, Jan. 8, 1987.

Almost every coordinator said that the degree to which computers enhance instruction is primarily dependent on the classroom teacher. The need for training and technological expertise is clear. One coordinator said, '... most school districts don't have staff who have expertise with computers. Thus, they don't utilize computers as they should." Another coordinator added, "If you have teachers who are not trained to use the technology, they won't use it. That's a bad use of limited resources. In places where teachers have been trained, the technology complements the program."

Given the fact that coordinators believed "computers are an advancement, but not a replacement" and that teachers are the key to effective uses of computers, it is important to note that several coordinators still said that computers are replacing teachers in public schools as well 's private schools in their State. This situation, which appears to be the result of a lack of funds, creates a real dilemma for State and local officials. It is not clear how widespread the problem really is, but its existence was mentioned by several respondents. One coordinator said, "... computers are replacing teachers in a few LEAs," and another noted, "If you can't pay for teachers, you pay for aides. If you can't pay for aides, you pay for computers."

Coordinators also contend that computers are replacing more traditional forms of drill and practice provided by workbooks, seat work, and other audio-visual instructional materials.

Is Computer Technology A Priority? Will it be in the future?

Although computers are being used in Chapter 1 programs to some extent in all States, only 11 coordinators indicated that investing in computer technology is a priority in their State. Thirty-nine coordinators said that it is not. (See Figure 2-8) Coordinators cited two factors that can influence the setting of priorities. First, if there is a high technology initiative in a State or if the State education agency or legislature has taken an active interest in educational technology (e.g., marinating computer literacy

FIGURE 2-8

IS INVESTING IN COMPUTER TECHNOLOGY A PRIORITY NOW?*



WILL IT BE IN THE FUTURE**



* Note: One State coordinator did not answer the question.

** In 4 States where investing in computer technology is not a priority now, it will be in the future.

In 6 States where investing in computer technology is not currently a priority, coordinators do not know if it will be in the future.

In one State where investing in technology is now a priority, the coordinator said it will not be in the future.

In another State where investing in computer technology is currently a priority, the coordinator does not know if It will be in the future.

SOURCE: OTA survey of State Chapter 1 coordinators.

courses) then the Chapter 1 program in that State is more likely to view investing in technology as a priority. The second factor that influences priorities for Chapter 1 services is, quite simply, money. Some coordinators said that they would invest in technology if they had more money: 'If there was enough money so that I could be sure I wasn't taking anything away from kids, then I'd be more willing to approve purchases." In many States, especially States with small, rural districts that receive very small allocations, there is not enough money to purchase computers after teachers' salaries are paid.

One way of dealing with limited resources is to use technology more and reduce the number of teachers and aides. However, most coordinators are committed to maintaining or increasing the human resources, as noted above. Whether or not investing in technology is a priority, all of the coordinators said that they do not believe computers should ever replace teachers. Their common belief was best expressed by two coordinators:

Chapter 1 kids need encouragement more than any other type of student. They need encouragement more than skills. They'll learn the skills once they are motivated. We need computers as a support to help motivate kids, but we need teachers more. With all of their lights and buzzers, the computers cannot give hugs and smiles. The computer cannot say to a child, "Hey, I'm proud of you. You did well." or "I am glad to see you today~'

The great advantage of personnel is they can interact with kids. Computers can do that to an extent, but they are not sensitive enough to give kids warm, supportive feelings. We don't assess that in Chapter 1. But one of the things we do best is help kids feel good about themselves.

Do Federal Regulations Affect the Use of Chapter 1 Funds to Purchase Computers?

Federal regulations require that equipment and materials purchased with Chapter 1 funds be used solely to benefit Chapter 1 students. When asked, on the mail survey, if they felt Federal regulations affect the use of Chapter 1 funds to purchase computers, an overwhelming majority (46) State coordinators said no. However, three coordinators said that Federal regulations discouraged computer purchases in Chapter 1.* They indicated

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One coordinator did not answer the question.

that a valuable resource was being wasted because some computers purchased with Chapter 1 funds sat idle when they were not being used by Chapter 1 students.26

Its important to note that Chapter 1 funds can be combined with other funds to purchase computer hardware and software as long as the costs and the access to the technology are prorated fairly between Chapter 1 and non-Chapter 1 students. The follow-up telephone survey revealed, however, that some coordinators did not understand how the use of computers can be prorated and that others did not allow such use to be prorated. Coordinators expressed great concern about compliance. Although coordinators were reluctant to suggested any specific changes in the regulations, four coordinators said that the Federal Government needs to clarify or to provide additional guidelines in this area. One coordinator suggested:

there be some clarification about the use of Chapter 1 funds to purchase computers. [We need to know:] can the equipment be used in the afternoon, for example, for non-Chapter 1 students if Chapter 1 students use it in the morning? Who will pay for the repairs [if costs are prorated]? Cost-sharing guidelines would be helpful.

Coordinators' Suggestions

There was little agreement among coordinators about what action, if any, Congress should take regarding the use of educational technology in Chapter 1 programs. Several agreed with the coordinator who said, "It should be left up to the States and the LEAs to determine what type of materials and supplies it takes to operate a successful program in the schools." Another coordinator added, "Leave it up to LEAs to decide whether or not and how to purchase computers. Give us the flexibility to determine what our needs are and how best to meet them."

^{26.} According to a 1983 report, the regulation which prohibits use of Chapter 1 funds for non-Chapter 1 purposes may effect the "availability of computers in Chapter 1 programs. This report also cited anecdotal evidence which indicated that "some local [school] systems have nevertheless decided not to use Chapter 1 funds for computers because of their concern for maintaining compliance with [Federal regulations]." For more information see Reisner, op. cit., p. 9.

Several other coordinators stated, however, that funds should be set aside for the purchase of educational technology. Many coordinators in rural States said that funds should be set aside for districts with small Chapter 1 allocations. "Small school districts' allocation is often less than \$20,000. You aren't going to be able to do much with technology because you have to pay a teacher% salary, which comes to \$16,000 with fringe benefits."

Whether or not funds are set aside for the purchase of computer based technology in Chapter 1, many coordinators believed that Federal regulations regarding the use of Chapter 1 funds to purchase and/or lease hardware and software should be amended or clarified. Several coordinators wanted regulations or legislation to clearly state that "it [is] legal to purchase computers and to "allow the purchasing to continue." Apparent confusion over the content as well as the intent of the regulation prohibiting the use of Chapter 1 funds for non-Chapter 1 purposes has resulted in differences in the ways computers are purchased and used among States. In some States, coordinators have made policies based upon a strict interpretation of this aspect of the Chapter 1 legislation; these States do not allow the costs of computer use to be prorated. Other States have dealt with this uncertainty by encouraging the use of Chapter 2* funds or local or State monies to buy hardware, using their Chapter 1 funds to buy software only.

Some coordinators felt that the technology could be a big help in program evaluation. It has already enabled teachers and administrators to reduce some of the burden of administering the Chapter 1 program. These coordinators expressed hope that Congress will not discourage the use of computer technology for this purpose.

They also suggested that Chapter 1 databases could be created in the future so that LEAs, SEAS, and the Federal Government could share access to them. Some coordinators recommended that the reporting formats for National, State, and local evaluations be

^{*} Chapter 2 of the Education Consolidation Improvement Act consolidated variety of categorical grant programs for education into a single educational block grant.

standardized. One coordinator pointed out that such a database and standard report format already exists in one portion of Chapter 1 programs. The Migrant Student Record Transfer System (MSRTS) transmits educational data from one LEA to another about students who move frequently owing to the agricultural season.^{*} It has been operating for several years. This coordinator suggested that such a database could be installed for all Chapter 1 students, especially if individualized educational plans become mandatory. The coordinator added that such a database could also be used to track such students after they leave the Chapter 1 program.

If there was any agreement on future needs, it was with regard to the need for teacher training, for further research and development (R&D), and for "high-tech" demonstration sites. Many coordinators said that Congress needs to pay more attention to teacher training in the use of technology in Chapter 1 programs. According to one coordinator, 'Congress needs to fund training programs and demonstration sites which are tied into these programs." Another coordinator said, 'Congress should make provisions for training administrators at the State and local level as well as teachers and aides in the use of technology."

Coordinators also felt that Congress should invest money in R&D and in demonstration sites that incorporate state-of-the-art technology with various Chapter 1 curricula:

We need to find out what kinds of technology work with Chapter 1 kids. We need demonstration sites that implement a variety of uses. Variety is important because different school districts have different needs.

Coordinators also seemed concerned that schools were not tapping the potential of new information technologies. One coordinator lamented the fact that very few software programs are presently available which make use of breakthroughs in artificial

^{*} The (MSRTS) database located in Little Rock, Arkansas, contains the name and grade of all students who have been identified within the past 5 years. Each student's record contains a variety of information, including courses of study, achievement scores, health information, LEP status, and special education status.

intelligence. Another said that schools have not realized the power of satellite communication. This coordinator suggested that this means of communication could provide a new range of opportunities for educationally disadvantaged children. For example, satellite communications could enable students to talk with leaders in politics, entertainment, and sports. A third coordinator commented:

...technology is ever changing. People are always finding new ways to use the technology creatively. Perhaps Congress should give money to TAC centers or to college and university labs to help develop new technologies or adapt existing ones to meet the needs of disadvantaged students.

According to the coordinators, the demonstration sites and R&D efforts should yield data on the effectiveness of computer based instruction for educationally disadvantaged children. Many coordinators lacked information on effectiveness or were skeptical of the existing data. "I'd like to see some empirical information that the use of computers is better than what we were doing before computers — some good, hard data." Another coordinator said:

Technology is important. Maybe Congress should try things out in test sites, in a practical sense so that it (the technology) really meshes. Find out what works and what doesn't in schools.

IMPLICATIONS FOR FEDERAL POLICY

The findings of the OTA survey have several implications for Federal policy. In reauthorizing Chapter 1 of the Education Consolidation Improvement Act, Congress may want to consider the following:

 Clarify existing regulations regarding the use of Chapter 1 funds so that LEAs and SEAS know how to prorate the purchase and maintenance costs of hardware and software.

- Monitor the use of computers as a remedy to the <u>Aguilar</u> v. <u>Felton</u> decision. Many approaches are being tried; it may be too soon to make changes in legislation and/or regulations.
- Establish demonstration projects which integrate state-of-the-art technology into a variety of Chapter 1 programs. These projects could be implemented in a variety of ways, including matching funds, grants, monies that are set aside, or the Secretary of Education's discretionary fund.
- Encourage future R&D projects in the fields of cognitive and computer science to consider the needs of disadvantaged students.
- Encourage technology transfer efforts to be responsive to the needs of these students.
- Encourage dissemination of information about the use of educational technology in Chapter 1.
- Study the feasibility of a database for Chapter 1 students similar to the Migrant Student Record Transfer System. Such a database might be especially useful in districts where a high percentage of students move from school to school during the year, or where individual education plans (IEPs) are in use.