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ABSTRACT

This second phase of a project to promote adoption of new educational technology by special education administrators includes three case studies conducted in eastern U.S. school districts. Information was gathered on activities and perspectives of special education administrators concerning technology, technology implementation in the district, and the use of computer technology in special education. Surveys generated information on demographics of the school district and the local schools and on hardware and software used by the school districts. Interviews were conducted with special education administrators, computer coordinators, and teachers involved with computer use, as were observations regarding computer usage. Survey results for the three school districts are presented, including demographics, key staff involved, planning and evaluation of new programs using technology, special education planning and evaluation, provisions for training and technical assistance, hardware and software selection and use, and alternative uses of computers. In addition to an analysis of the survey results, administrator guidelines are presented for integrating computer technology into special education programs. Study questionnaires are appended. (SW)

# Final Report - Phase II

# Studies of Special Education Administrative Involvement in Computer Implementation

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Submitted to:

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# Final Report - Phase II

# Studies of Special Education Administrative Involvement in Computer Implementation

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**October 1991**

# Final Report - Phase II

# Studies of Special Education Administrative Involvement in Computer Implementation

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# Chapter I

# Overview

# Chapter I. Overview

## I. Review of the Model

Based on previous research, particularly, "Evaluation of the Integration of Technology for Instructing Handicapped Children (High School Level," (Office of Special Education Programs, U.S. Department of Eduction), Macro conceived and refined a model of educational technology integration as a process involving four interrelated domains: *administrative*, *human resources*, *material resources*, and *instructional applications*. (A "domain" represents a focused sector of issues and activities within this process.) The *administrative* domain refers to decision making about computer technology acquisition and instructional use; the *human resources* domain, to staff training and technical support; the *material resources* domain, to hardware and software acquisition and implementation; and the *instructional applications* domain, to classroom uses of microcomputer technology within instructional programs.

The model recognizes that, as a process, technology integration takes place through time, in an ongoing manner that requires continuing cycles of decision making, application and evaluation. This process incorporates information in the sense that each domain receives inputs and transforms them to produce some different output. While the activities represented by the domains may overlap in the structure of the organization, the domains themselves are defined in terms of their distinctive output of information and action.

This model differs from structurally based models that emphasize conventional, hierarchical patterns of organization: from school board to superintendent to principals to teachers to students.[1] Our model's administrative domain, for example, is not coterminous with those who are designated as professional "administrators," but encompasses, more broadly, those activities and issues that result in administrative outputs, that is, making decisions which ultimately affect technology use in classrooms.

The model is graphically represented in Figure 1. The solid arrows indicate determining outputs. Thus, the Administrative Domain (I), provides information that directly affects the Human Resources Domain (II) and the Material Resources Domain (III). These latter domains, in turn, largely determine the resources available for the support of the Classroom Instructional Applications Domain (IV). The broken arrows that progress from Instructional Applications to Human Resources and Material Resources, and from these latter domains to the Administrative Domain, represent the feed-back processes that constitute part of the inputs available to these domains.

[1] Barr, R., and Dreeben, R. (1983). How Schools Work. Chicago: University of Chicago Press.

One important feature of this model is that it identifies the linkages between administrative processes and computer applications as indirect. Thus, while administrative decision making produces effects in human and material resources, it does not in itself guarantee results in instructional applications. Even with all the hardware, software and training imaginable at their disposal, teachers may resist changing established routines to incorporate technology into classroom instruction. Nonetheless, continuing change in other domains will create incentives as well as pressures on instructional staff to incorporate the technology over time.

Even the secondary feedback linkages between instructional applications and administrative processes are generally indirect. Without a detailed awareness of classroom experiences and needs, activities in the human and material resource domains are uninformed in this most important respect and are thus likely to produce ineffective and undesirable outputs.

Finally, it should be noted that direct, albeit infrequent, linkages can exist between domains which are otherwise only indirectly connected. For example, staff may find access to material resources on their own initiative, or through local, fundraising efforts, a process indicated by the broken arrows linking these domains. Similarly, some administrative decision makers may involve themselves directly in monitoring classroom activities, a process represented, again, by broken arrows directly connecting these domains.

Macro's model emphasizes the dynamic aspects of domain interrelationships, rather than the domains as relatively unitary components within a set structure. It is this dynamic emphasis that enables the model to address issues pertaining to technology integration among districts or schools that differ organizationally and in composition. By representing technology integration as a structured process of information flows and feedback loops, the Macro model not only provides a basis for describing and analyzing actual situations, but also implicitly charts a course toward the development of schools and districts as dynamic, highly sensitive systems of information flow and organizational processes.

## II. Synopsis of Phase I Findings[2]

The purpose of this study was to describe the level of involvement by special educators, particularly special education administrators, in technology planning and implementation. In Phase I, telephone interviews were conducted with staff involved in special education and/or technology implementation in 100 randomly selected school districts in the United States. In each district, the special education administrator, a computer-using special education teacher, and the computer coordinator (if there was one), were interviewed. The districts were stratified according to the number of students in each, into the categories small, medium, and large, so that we could investigate the similarities and differences among them.

[2] Complete details of Year 1 for this project are contained in Final Report—Phase I, Studies of Special Education Administrative Involvement in Computer Implementation, Macro Final Report, February 22, 1990.

Survey questions focused on obtaining information on the status of a number of factors thought to influence the use of computers in special education programs:

- The special education administrator's involvement in key decision making processes,
- Communication between district and building level administrators (primarily via participation in technology-focused committees),
- Interaction between special education administrators and their teachers,
- Interaction between special and general education teachers and programs,
- Availability of training and technical assistance to special education teachers, and
- Use of computers for special education administrative applications.

## A. Special Education Administrator's Involvement in Decision-making Processes

Special education administrators were very involved in the distribution of computer resources within their districts. Ninety-two percent of the administrators said they participated in decisions regarding how computer resources for the special education program were distributed. Eighty-three percent said they purchased either hardware or software for special education instructional applications using funds appropriated for the special education program.

Nearly sixty percent of the administrators said they had input into the selection process (e.g., reviewed software). Only 30 percent actually made the selection. (Selection of software was largely left up to the teachers.)

Fifty-three percent of the administrators in large districts reported that they met with a committee on a regular basis to plan for and make decisions about computers and their use in the special education program. By contrast, only 18 percent and 45 percent of small and mid-sized district administrators, respectively, worked regularly with a committee. (The frequency of committee meetings varied. Fifty-seven percent of the administrators reported monthly committee meetings, and another 25 percent reported between one and five meetings during the school year.)

Two thirds of the administrators who worked with a committee said their committee functions included planning for computer use in instruction. Nearly three-fourths of the administrators said they used time in committee meetings to set curriculum goals for computer use.

## B. Communication Between District and Building Level Administrators

Outside of the committee process, 69 percent of the special education administrators worked with other administrators at the district-level to make computer-related decisions, and half worked with administrators at the building level.

## C. Interaction Between Special Education Administrators and Teachers

Although we found that the vast majority of administrators (92 percent as previously mentioned) were involved in the decision-making process concerning computer use in special education programs, there was less evidence of direct interaction between administrators and special education staff in making these decisions.

Two-thirds of the teachers in the small and large districts, and half the teachers in the medium districts said they took part in decisions on the distribution of computer resources. When asked whether they worked with administrators on a regular basis to make decisions about computers, 36 percent of the teachers said they worked regularly with district administrators, 40 percent with building administrators and 34 percent with other special education administrators to make decisions about computer use.

The main setting for administrator-teacher interaction was committee meetings, especially in medium and large districts. Two-thirds of the committees responsible for planning computer use included special education teachers and special education administrators alike. Thus, the committee provided an opportunity for direct interaction between teachers and administrators in the decision making process.

The committees on which teachers served were likely to be organized on the district-level (64 percent).. Committees were likely to convene one to five times per school year, but this varied greatly according to the size of the district. In small districts, 89 percent of the committees met one to five times a year, and 11 percent met six to ten times. In medium districts, 38 percent met one to five times a year, 11 percent met six to ten times, and 19 percent met over 10 times, and in large districts, 39 percent met one to five times a year, 29 percent met six to ten times, and 32 percent met over 10 times.

## D. Interaction Between Special and General Education Teachers and Programs

Seventy-seven percent of the teachers surveyed said that special education and regular education students used computers together, in one location or another, and over half of the teachers said this occurred on a daily basis.

Regarding formal mechanisms which might facilitate communication between the special education and general education staff about computers, 44 percent of the administrators and

54 percent of the teachers interviewed said that no such mechanisms existed. The most common communication channels were meetings (26 percent) and inservice programs, such as after-hours workshops and seminars (23 percent). The next most widely used vehicle was the computer coordinator (six percent), followed by team teaching (five percent).

Although only 8 percent of the administrators and 2 percent of the teachers said they had computer bulletin boards in place (either at the district or building level), 100 percent of these respondents said the special education staff used the bulletin board. If an electronic bulletin board is established at either the district or building level, there is evidence that special education staff will take advantage of the opportunity to communicate with other staff.

## E. Availability of Training and Technical Assistance

Ninety-four percent of the special education administrators and 90 percent of the teachers reported that technical assistance for computers was available to the special education staff. The administrators and teachers agreed that the two most common sources of technical assistance were the computer coordinator and a regular education teacher. Results were similar across districts, regardless of size. Twelve percent of the teachers in small districts and 8 percent in the medium districts reported that the school principal (or other school administrator) provided technical assistance, while none of the teachers in large districts reported building administrators as a source of technical assistance.

Frequently the computer coordinator was a formally established position. Overall, 53 percent of the administrators and 57 percent of the teachers reported that the computer coordinator's job was a formal position. This was more often the case in the large districts.

Administrators and teachers were consistent in reporting the components of the technical assistance programs. Both groups of respondents reported that the top four elements included:

- demonstrating software,
- installing or maintaining computer equipment,
- integrating computers into the curriculum, and
- identifying useful software.

The sole discrepancy between administrators' and teachers' reports concerned the role of the technical assistance provider in assisting teachers in integrating computers into the curriculum. Sixty-five percent of administrators, compared to 42 percent of teachers, indicated this to be a responsibility of the technical assistance provider. This could indicate either an overestimation by administrators or simply lack of knowledge among teachers concerning this important element of computer integration.

Incentives provided to special education staff to attend training activities on computer use included tuition reimbursement, reimbursement of expenses, and salary increment credits.

## F. Use of Computers for Special Education Administrative Applications

Two thirds of the administrators in the medium and large districts and 79 percent in the small districts said they used computers regularly for professional purposes. The most common professional applications were:

- preparing correspondence and reports,
- managing staff or student records,
- developing educational plans (IEPs) for students, and
- working with budgets.

## G. Additional Analyses

Although the primary purpose of this study was to describe the current level of participation by special education administrators in the overall process of technological innovation, project staff were interested also in determining if higher levels of special education administration involvement were, in fact, associated with:

- higher levels of staff involvement,
- increased availability of training and technical assistance,
- increased availability of hardware and software, and ultimately,
- higher levels of use by special education students.

It was decided that a correlational analysis might provide insight into these relationships. An examination of the individual items indicated that composite variables representing relevant constructs could be derived from the survey instruments. (See Appendix A for the Phase I Survey Questions and Appendix B for details regarding the composite Variables for Correlation Analysis.) The variables created were:

- Special education administration participation in planning and decision making through individual activities.

- Special education administration participation in planning and decision making through technology coordinating committees.

- Special education teacher participation in planning and decision making through individual activities.

- Special education teacher participation in planning and decision making through technology coordinating committees.
- Availability and accessibility of computer-related training and technical assistance to special education teachers.
- Special education teacher participation in computer-related inservice training.
- Availability and accessibility of hardware and software to special education students and staff.
- Use of instructional applications with special education students.

Based on the conceptual model of technology integration discussed previously, we were particularly interested in seeing if there was a statistically significant correlation between the two types of administrative involvement, individual and committee, and the material and human resources available to support the use of computers in special education. Furthermore, we were interested in determining the degree to which availability of material and human resources correlates with actual use of computers in special education classrooms. To this end, correlations were run between the variables representing administrative involvement and the variable representing level of student use, as well as between each of these and the other five variables described above.

The following results are Pearson correlation coefficients. We considered the correlation to be meaningful if the obtained correlation coefficient was significant at a level of .1 or less.

## Relationship between Administrative Involvement and Student Use

A statistically significant correlation coefficient was obtained for special education administrators' involvement with committees and actual use of instructional applications by special education students. This particular correlation, significant at .02, was one of the strongest obtained, and would appear to support the notion that the level of administrative involvement ultimately affects the level of student use. No correlation was found between administrative involvement through individual activities and level of student use, however.

This correlation was obtained using the responses from all the survey respondents, special education administrators, special education teachers, and computer coordinators. It was the only correlation among the composite variables which was statistically significant when the responses of individuals in all roles were considered. Because of the strength of this association, it seemed appropriate to look at the data again in an attempt to understand

more clearly the nature of the relationships between our constructs. When responses for each group were analyzed, a number of significant correlations emerged.

## Correlations Based on Responses of Special Education Administrators

Administrative involvement in both committee processes and through individual activities was found to be associated with the availability and accessibility of hardware and software to special education students and staff. The first correlation coefficient was significant at .05, while the second was significant at the .07 level. This would seem to indicate that increased availability of material resources for special education may be associated with either type of special education administrative involvement.

## Correlations Based on Responses of Computer Coordinators

Computer coordinators' involvement in the committee process was associated with increased availability of training and technical assistance, higher levels of participation in training programs, and increased availability of hardware and software. The last showed the strongest relationship with a correlation coefficient significant at .001. However, the availability of training and technical assistance was also associated with committee involvement of the computer coordinator, showing a correlation significant at .01. It is not surprising then to find that participation in training activities was also associated with this committee involvement, with a correlation coefficient significant at the .07 level.

## Correlations Based on Responses of Special Education Teachers

Special education teachers' involvement in the committee process was also associated with level of participation in computer-related inservice training. These two constructs were associated with a correlation significant at the .007 level. Another relationship with a direct bearing on student use was found between the availability of training and technical assistance and student use. Here the correlation was significant at the .004 level.

# Chapter II

# Phase II Effort

# Chapter II. Phase II Effort

In Phase II, case studies were conducted in three school districts in the eastern United States. It is hoped that the insights which resulted from this study will benefit special education administrators and others as they work to integrate computer technology into special education programs.

## I. Case Study Methodology

The proactive case study methodology used in other successful studies investigating technological innovation in special education was employed. The proactive case study method represents an attempt to bring case study methods more into line with traditional (a priori) investigative techniques. This methodology:

- Clearly defines and operationalizes the unit(s) of analysis,
- Poses planned research questions and propositions,
- Prespecifies the variables for the data collection and the types of evidence necessary to provide sufficient information, and
- Uses multiple sources of information to obtain valid and accurate information.

## II. Units of Analysis

The units of analysis were the individual school districts in which case study investigations were conducted. Information on the activities and perspective of the special education administrator related to technology, technology implementation in the district as a whole, and the use of computer technology in special education programs was gathered.

## III. Research Questions

Examining the data from Year I interviews and pertinent research, the researchers drafted and refined the following research hypotheses:

- An increase in the special education administrator's use of computers for administrative tasks results in increased involvement in district-level technology planning activities.
- A higher level of experience with computers outside the current job of special education administrator for either personal or professional use results in increased involvement in district-level technology planning activities.

- An increase in the special education administrator's involvement in district-level technology decision making results in increased numbers of computers and computer-related equipment (e.g., printers, adaptive peripherals) in special education programs.

- An increase in the special education administrator's involvement in district-level technology decision making results in increased numbers of software packages in special education programs.

- An increase in the special education administrator's involvement in district-level technology decision making results in increased planning of instructional computer use in special education programs.

- An increase in the special education administrator's involvement in district-level technology decision making results in increased availability of technical assistance and appropriate training for special education teaching staff.

- An increase in numbers of computers and computer-related equipment (e.g., adaptive peripherals) available for use in special education programs results in increased use of computer technology by special education students (in mainstream and special education coursework or in support in their instructional programs).

- An increase in numbers of software packages available for use in special education programs results in increased use of computer technology by special education students (in mainstream and special education coursework or in support in their instructional programs).

- An increase in planning of instructional computer use in special education programs results in increased use of computer technology by special education students (in mainstream and special education coursework or in support in their instructional programs).

- An increase in the availability of technical assistance and appropriate training for special education teaching staff results in increased use of computer technology by special education students (in mainstream and special education coursework or in support in their instructional programs).

In brief:

**Increased administrative use and/or**
**Greater outside experience**

lead to

**Increased involvement in district-level technology planning and decision making**

which leads to

**Increased availability of hardware and/or**
**Increased availability of software and/or**
**Increased special education technology planning and/or**
**Increased training and technical assistance**

which lead to

**Increased use of computer-based technologies by special education students.**

## IV. Site Selection

Four school districts were identified from Phase I data as having appropriate characteristics for conducting the Phase II case studies. These were responses from all three roles, specific indicators of technology use such as level of reported computer activity or student-computer ratio, and proximity to Macro. The number of sites and locations were based on resources available for Phase II work. The original design called for three to five case studies to be conducted in high technology using districts. Three of the four districts met this criteria. However, in response to a request from the COTR, one low-using district was included as a contrast site. Of the four school districts, two high technology-using and the one low technology-using district agreed to participate. The third high-using district, in opting out, cited difficulties in accommodating the study during the late spring timeframe.

## V. Data Collection Instruments

Given above propositions to guide our investigation, the case study instruments were designed. Survey, interview, and observation protocols were developed.

Survey forms for collecting demographic information and quantitative data were designed and mailed in advance of the site visits. To collect and verify qualitative and process data, semi-structured interviews were conducted. These semi-structured interviews were the primary source

of information gathered. In addition, direct observation was conducted to provide information on practices in action. Finally, when applicable, a review of relevant documents was undertaken.

## A. Survey

Four instruments were used to gather information on school district demographics, school district hardware and software information, and local school demographics:

- **School District Demographic Information** (to be completed by the Special Education Administrator) included information on enrollment, number of schools, number of teachers, organizational structure, ethnic profile, and socioeconomic profile.

- **School District Hardware Information** (to be completed by the Computer Coordinator) included information on number of computers and related equipment, availability, locations, student:computer ratio, selection procedures, and percentage of budget devoted to hardware purchase in special education.

- **School District Software Information** (to be completed by the Computer Coordinator) included information on types and number of software packages, availability and accessibility to special education, highest use software, selection procedures, and percentage of budget devoted to software purchase for special education.

- **Local School Demographic Information** (to be completed by the Lead Teacher) included information on type of school, special education enrollment, number of teachers, ethnic profile, and socioeconomic profile.

See Appendix C for additional information on survey instruments.

## B. Interview

Interview instruments were designed for each of the major roles involved in technology implementation: the special education administrator, the computer coordinator, a teacher who had taken a leading role in the use of technology (either in at the classroom, school building or district-level, referred to as the "lead teacher"), and other computer-using special education teachers.

The primary topics were those indicated by the research hypotheses:

- Current and past levels of use for administrative tasks in the position of special education administrator,

- Current and past experience with computers, both personally and in other professional roles,
- Current and past level of involvement in district-level technology planning activities,
- History of hardware acquisition in the district and amount of hardware currently available in regular and special education programs,
- History of software acquisition in the district and amount of software currently available in regular and special education programs,
- History and current level of appropriate training and technical assistance for special education teaching staff,
- History and current level of planning efforts focusing on computer applications in special education, and
- History and current level of use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

Both general and special education specific questions were generated that would yield information on these topics. Each question was then assigned to the person or persons most likely to have the answers. For instance, administrators [A] received the following questions from the topic area, ***Current and past levels of use for administrative tasks in the position of special education administrator:***

**Background:**

[A] For what administrative purposes are computers being used in the district?

[A] What is the history of administrative use of computers in the district?

**Special Education Specific:**

[A] How are you and your staff (not teachers) currently using computers for administrative purposes?

[A] Approximately how much time each day (or each week) do you yourself use a computer to accomplish some administrative task?

[A] For what administrative purposes have you used them in the past?

[A] Are you currently using them more or less than in the past? Why?

In addition, the computer coordinator answered the background questions for this topic. For the complete interview instrument with reference to the person(s) who answered individual questions, see Appendix D.

### C. Observation

Finally, an observation form was created to prompt researchers regarding specific information to capture during an observation. The following information was recorded for each observation:

Date of observation
Start time
Stop time
Duration of activity or activities

Description of setting (including all hardware present)
Description of the population by handicapping condition and its severity
Level of service (e.g., resource room, self-contained class, special center)

Number of computers available in the setting
Number of students
Number of students using computer(s)

Name of software program used
Type of software
How lesson was introduced
How used (individual, small group, whole class)
Transition(s)
Conclusion/closing activity.

## VI. Conduct of Data Collection

Each district arranged for the interview of the special education administrator, the computer coordinator, a teacher who had taken a leading role in using technology with special education students, and other special education teachers who were using technology with their students. In two of the districts, five additional teachers participated through interviews and observations. In the remaining district, three additional teachers participated.

Forms eliciting quantitative data were mailed several weeks in advance, to give sites time and flexibility in completing them. Suggestions for the person who should complete the form were also made. The researchers collected the forms during site visits or the forms were mailed to Macro shortly after the visit.

Interviews took place in May 1990, over two, three, or four days. Two or three researchers participated in each interview, one researcher taking a leading role in guiding discussion with the interviewee, while the other(s) captured the discussion in notebooks. Interviews were semi-structured and were conducted as informally as possible. In many cases, one or two questions were sufficient to launch discussion in an area under investigation, which more often than not led logically to another topic. The flow of discussion resembled a spiral more than a line, then, with a topic mentioned several times and elaborated upon one or more times during the conversation. Each interview concluded with the researchers scanning the appropriate interview instrument to determine whether all questions were answered.

The evening following a day's work on-site, the researchers gathered to debrief each other. This enabled researchers to maintain consensus on the information collected and needed, and to plan for data collection on the following day. The day's notes were also reviewed, to ensure legibility.

Upon completion of each site visit, one researcher drafted an interview report. The other researcher(s) who participated in the interview reviewed the report and made additions and corrections.

Researchers sent the drafts of the interviews to the interviewees. This review step is important to assure participants of Macro's commitment to accuracy and interest in their perceptions and understanding of what is occurring in the district, as well as to clarify and verify information regarding the validity of the research. Prior to mailing researchers removed judgmental language and all names, abbreviations, and contractions. Questions regarding unresolved issues and needs for clarification were included within the text of the interview and in a cover letter to the individual interviewee.

The written interviews were mailed in October 1990. All interviews for a district were sent directly to the interviewee. A deadline of three week's time was given for reply. Interviewees were invited to make corrections and clarifications on the written documents, or to telephone the coordinating researcher and give their feedback verbally. Interviewees were informed that, when the deadline passed, the researchers would assume the notes were in satisfactory order.

As is often the case in setting deadlines, they pass unnoticed. Contact was made with the contact person and the deadline was extended. Altogether, two of the three administrators, two of the three computer coordinators, and eight of the 13 teachers responded either by phone or mail by late November. The majority of these responses were clarifications or answers to questions posed by the researchers. Revisions suggested by individuals were made to the documents as they were received.

## VII. Data Analysis—Coding and Interrater Reliability

A coding scheme for interviews was initiated using the main topic and the question number from the interview instrument. A document laying down a systematic method for capturing emerging themes and patterns was developed and discussed to assure complete understanding by project staff.

To determine the consistency of coding across researchers, interrater reliability was computed. Each researcher received a copy of two interviews, one the interview of a special education administrator and the other the interview of a teacher in order to establish a degree of interrater reliability. Researchers worked independently, and regrouped to evaluate their progress. It became clear that coding to individual questions could prevent them from building the larger picture of technology integration for an interview. They agreed to code to the topic level only and to multiple topics if, as was often the case, the text made reference to more than one subject. It was also agreed that, following the coding of an interview, the researcher would write a brief narrative overview of the interview.

Interrater reliability exceeded 90 percent for both the special education administrator and the teacher. Each district was then assigned to a researcher, with the criteria that the individual researcher had to be present for all interviews in that district.

Coded interviews, observations, completed demographic and material resources survey instruments, and collected documents will be retained by Macro International Inc. The case studies which appear in the following chapter are based on all documents, but rely most heavily on the coded interviews.

# Chapter III

# Case Studies

# I. District A

## A. Demographics

District A is the largest district included in this study. It contains 17,156 students in:

- 24 Elementary schools
- 8 Middle schools
- 7 High schools and
- 3 Special centers

Altogether, the special education enrollment is 2,816. The district is in a rural community one hour from two major cities on the eastern seaboard. There is one small city in the county, and increasingly the county is serving as a bedroom community for workers in the nearby suburbs of a large eastern city.

The ethnic composition is predominantly Caucasian (five percent of the students are from minority backgrounds). The county is experiencing some growth, as it is located close to the "high-technology corridor" between the two cities mentioned above.

District A is a high technology-using district, and is experiencing considerable activity.

## B. Key and Supporting Players

### 1) The Special Education Administrator

The special education director has been in the county system for 17 years. She has been supervisor of special education since June 1989. She was a teacher of preschool, multiply handicapped children for two years and then served as a coordinating teacher for several years in the special education division. She served as assistant to the special education administrator for nine years, then as principal of the center for severely/profoundly handicapped students for two more years. She returned this year to the central office to be the special education administrator. Throughout this administrator's career, regardless of her position, she maintained contact and involvement with the activities and functions of the central office.

The special education administrator believes in the use of technology, both for administrative purposes and as technology for students with handicapping conditions. When she was principal of the center for severely and profoundly handicapped children, technology was a major priority for her. She believes special education centers can serve as a seedbed for innovative technologies, which can then be disseminated more widely. The special education administrator is well-informed about what is happening in special education but feels isolated from what happens in regular education around the district. This is due to her pressing, day-to-day responsibilities.

Regarding the special education administrator's experience and use of computers, she was introduced to assistive devices in two previous positions, as principal at the Severely/Profoundly Handicapped Education Center and as assistant to the previous special education administrator. She was immediately interested and open-minded. "What's best for the kids?" was her guiding question. The district was not increasing its use of technology at that time because of the previous special education administrator.

The current special education administrator has taken one course in word processing and uses the personal computer in her office approximately 1/2 to 1 hour per day. She relies on secretarial support for additional word processing. Her assistant has an IBM and her secretaries have just upgraded from Apple IIs to IBMs.

When she goes out to special education centers to conduct teacher evaluations, she brings along a disk to write up reports on a computer that is available. She has considered getting laptops for itinerant professional staff to use in the field, but heard of one district which purchased them, only to find they were incompatible with existing mainframe systems.

She believes she does not need to be a skilled user but recognizes the need to understand the capabilities of computers to support her administrative needs. In the IEP development process, she was the "conceptualizer and thinker." Teacher 2 fleshed out the details and handled the technical aspects of the project.

The special education administrator sees her primary role related to technology as a fundraiser, thus, she felt the need to work as an overall planner and planned to work closely with Teacher 1 (the representative to the Microcomputer Advisory Committee [MAC] and a technology resource person). To get the equipment they need, the special education administrator felt they would need to prove that current access is difficult for special education students.

The special education administrator can cite several sources of funds for equipment: the district's budget, donations, and partnerships. Partnerships and donations are

possible, but they learned from experience that clearly defined projects regarding technology use were needed for their efforts to be convincing. ("Often people will say, 'We have money, if you know what to do with it.'")

### 2) The District Computer Coordinator

The district computer coordinator supports the use of microcomputer committees for decision-making, answering their questions and making them think through their use of technology. If a principal has a request, the computer coordinator asks, "What are your goals and objectives?" rather than merely answering the question. Many schools are now thinking in terms of numbers. "We want 26 PCs" they might say, but they do not know the reasons for the request. The computer coordinator and others in the district have dealt with this before, hence their objective-oriented philosophy.

Regardless of the objectives for the year as expressed in the formal technology plan, the district computer coordinator encourages ideas "from the field" at any time. For instance, he and the supervisor for art recently went to the schools to meet with teachers who wanted to write proposals for grant money. "If you always say 'No' to the teachers, you'll stifle their enthusiasm. Sometimes it helps to stay open-minded, even if their ideas seem off the wall.... If it were not for creative-minded individuals, we wouldn't be where we are today."

### 3) The Superintendent and Board of Education

The superintendent of education is very pro-technology and initiates and encourages technology efforts. The computer coordinator, working with the supervisors of business, science and math makes presentations and recommendations to the Board of Education regarding options for integration of technology and they make the ultimate decision.

### 4) Department Level Supervisors

There had been consideration about separating the offices of the supervisors and moving them from the central administration building into school buildings. This would have meant, however, that the computer coordinator would lose immediate accessibility to the supervisors, and he opposed the move. The computer coordinator feels very strongly that he needs to be close to the supervisors and for purposes of curriculum planning, it is more important for them to be close to him than for them to be close to the teachers. The decision was reconsidered, and the supervisors, the computer coordinator and his staff remain in the Board of Education building.

The business lab supervisor is responsible for the integration of technology into the curriculum. This may seem unusual, as he is without direct authority in the area, but this district operates without territorial divisions. When people have a good idea, they are encouraged to act on it, and the business supervisor took the lead role in this effort. As the district computer coordinator says, "A lot of ideas come from the teachers, but decisions rest ultimately with the supervisors."

### 5) The Local Utility Company

A unique aspect of this district's technology plan is its relationship with the local utility company. The local utility company had mistakenly overcharged its customers and was correcting the error by guaranteeing the district $5,000 per year for each of four sites. The company influences technology planning with monies specifically reserved for specific aspects of technology integration (for instance, training or integrated learning systems). Their philosophy is "Come up with anything to get technology to the kids." A position was also created and funded by the utility company to oversee and assist the schools in using technology to increase the employability of the workforce, from elementary schools up.

### 6) Teacher 1

To carry out the mainstreaming requirements of P.L. 94-142, District A established a part-time position called the School Inservice Coordinator for Mainstreaming (SICM). Teacher 1 is the SICM in District A. In this position, she is responsible for finding out about the technology necessary to support students in the mainstream.

At first, there was no liaison for special education on the district-wide computer committee, but Teacher 1 is now on the committee and watches for special education interests.

The special education administrator relies heavily on Teacher 1 for advice on technology. (The special education administrator is not well-informed about the specifics of technology use in the district; for instance, she was unsure if there was a formal technology plan, but suspected one was in process. Teacher 1, on the other hand, helped draft the technology plan.)

### 7) Teacher 2

At the Job Development Center (a special center), Teacher 2 is the de facto computer liaison. At first he was not invited to meetings of the computer liaisons in the district, but he has since been invited. However, he has found them less useful than

he had anticipated. He has developed a friendship with the computer coordinator's assistant and feels they get what they need and deserve in terms of monies available for technology in the district. When the assistant has funds available, she sends him catalogs, etc., and keeps him informed as to what might be appropriate for students at the Center.

The computers are a group effort at the Center, where everyone pitches in. There is an end-of-the-year form teachers fill out regarding PC use. Teacher 2 compiles them and sends them to the computer coordinator's office. Evaluations are supposed to be done by the teachers, and he, in turn, is supposed to sends them in, but this happens infrequently. Most information, however, is conveyed by word-of-mouth.

### 8) Professional Support Staff

Staff who report directly to the special education administrator are the principals of the three special centers, six coordinating teachers, itinerant support staff (psychologists, speech therapists, etc.), her assistant, and two secretaries. The staff is similarly involved in the planning for technology use that occurs within the office of the special education administrator. As the administrator sees it, these are the people who identify needs in the schools, and who support the technology that special education requires in the classrooms.

## C. Committees

### 1) District-level

In 1982, an Instructional Technology Advisory Committee (later renamed the Microcomputer Advisory Committee [MAC]) was formed at the district-level to develop a formal technology implementation plan. The primary body for technology planning is still the MAC. It has district-wide representation, including: the computer coordinator, teachers and principals from elementary, middle, and high schools; the supervisors of elementary education, language arts, reading and media, mathematics; the director of curriculum and supervision; a resource teacher for the gifted and talented program; and Teacher 1, representing special education. The supervisor of educational services chairs the committee.

The district-level technology committee is responsible for the formal technology plans (the district is in the middle of its third three-year plan) and equipment purchase decisions.

Subcommittees on the MAC are primary, middle, English as a Second Language, and Talented & Gifted. Special education was a fourth group, separate from the others, but it has now been integrated into the standing committees.

## 2) School Level

With the move toward school-based administration, the MAC decided that each school should have a committee that focuses on a particular school's use of technology, how they want to use technology, what their focus for technology will be, and what training they will need to accomplish their goals. School-based administrators were the last to realize the need for technology. These committees are more active at the elementary level than the secondary level.

Each school committee functions differently. Guidelines, which are incorporated into the technology plan for the district, allows for each school computer coordinator to have a free class period, a more flexible schedule or some other compensation.

These school-based committees are not linked to the MAC, although communications from the school travel via the liaison to the MAC. The liaisons are the troubleshooters.

School-based management has come to District A. The special centers have the same discretion over program priorities as other schools do. Two of the centers have made computer access a priority, making certain that computers are available to their students. However, the center for severely or profoundly handicapped students chose communications equipment over computers as their top priority.

The plan for one elementary school was acquired by the researchers. It illustrates that the committee had vague ideas regarding technology, but sought to become more informed. The plan states that, "it has been decided that our school will use the lab to emphasize math skills." A document on proposed lab sites reveals that three are under consideration, but identified modifications were very superficial (for instance, "a wall will have to be removed"). In-service training is suggested in three areas, broadly defined as "computer technology," "computer goals," and "math skills."

Goals proposed by the computer committee included:

- Staff will become more computer literate.
- Staff will become more aware of computer programs available at our school.
- Staff will show evidence of using the computer as an instructional tool in their classrooms.

- The students will become more aware of computer uses and its language.
- There will be more computer use by the students, beginning with drill and practice disks and continuing with other types of program.

Goals will become operational based on the following example of objectives. For the goal "Staff will become more computer literate", the objectives read:

- Attend computer awareness workshop being held on (date);
- Attend a computer workshop or take a class on computers;
- Look through computer awareness curriculum guide and other materials available in the library;
- Preview The Friendly Computer and Apple Presents an Introduction disks; and
- Utilize Teaching and Computers magazine and/or other periodicals.

## D. Technology Planning and Evaluation

### 1) Planning for New Programs: An Example

District A was described as a "friendly" community where informal communications and relationships are critical to progress. If a program needs to be implemented quickly, a plan is drawn up, implemented, evaluated and improved, if necessary. As one teacher described the experience of implementing a state-mandated transition program in a short space of time, "maybe the difference is that she calls ["Mary" (this is an alias for the Special Education Administrator)] and in [County 2] they call "Dr. Brown," or "Mrs. Green." A neighboring county established a whole office for transition. Here, we just 'did' transition. We didn't create a special committee, or meet about it—we just did it. We set a goal that we'd have a tentative plan in "x" hours, and we had a program up and running in a few months." "We're allowed to make mistakes, as long as we learn from them. So we do it, then evaluate and modify it later to best meet our needs. But it doesn't have to be perfect the first time out. And that's really important."

The community's reaction to the way the district operates is supportive. "To a large degree, we have the trust of most of the people we serve, as long as we don't step on their sacred cows. We felt a strong reaction to moving 5th graders into the

middle schools, but generally, they trust us. The level of sophistication is somewhat less here than in other districts."

### 2) The Early Days

Formal planning began in 1982 with the establishment of the MAC. The first plan was a three-year plan. At that time, goals for instruction (literacy, awareness and programming) were stated, primarily to acquire hardware. Before the first plan lapsed, another 3-year plan was developed which one is currently under development. (The researchers received a copy of the second 3-year plan.)

Purchasing procedures for hardware and software acquisition were established, but broke down with an influx of monies via a partnership with a local utility company. Things were highly decentralized and disorganized. The computer coordinator "fueled the fire of confusion" to the point that the deputy superintendent had to make a decision about who would administer the program, and the decision was made to place that authority in the hands of the computer coordinator.

### 3) The Second Stage

Things have become more structured as computer use has increased. The second technology plan specifies that both the schools and the activities be conducted at startup: "purchase Apple microcomputers, construct the lab classroom, conduct teacher training, name a computer classroom liaison for each school with additional time provided for coordination, designate a school-based computer advisory committee, develop a school action plan for use of the computer classroom, begin instruction and evaluation." Objectives were set to establish a maintenance process which enables schools to receive assistance expeditiously and to draft a standard computer proposal that permits the Board of Education and outside agencies to enter into cooperative agreements to establish future computer classrooms in the public schools.

In the last plan, the importance of labs for instruction and the need for integration into the curriculum were highlighted. The plan currently has 29 of the 45 schools furnished with labs, and the county is committed to finishing the initial placement of computers in the remaining 16 labs over the next three years.

Today, careful attention is paid to the instructional uses of microcomputers, but there is flexibility to deviate from plans, as needed. Curriculum planning is done by special education and regular education by subject areas at the elementary, middle and high schools. At the school level, teachers usually stay in groups according to subject areas. Supervisors link the groups' planning. Special education

representatives are invited to attend planning sessions, but realistically it would be hard for them to take a very active role. "They would be in meetings all day."

Curriculum matches are under way, including integrating software and textbooks. Throughout the year, the supervisors are working to integrate computers into their programs. The elementary schools have been doing curriculum matches, as have the middle and high school math departments. Last summer, the focus was on middle school humanities and word processing curricula.

There is considerable curriculum work done in summer workshops. "We'll take 2 weeks, often half of each day, pay ten dollars per hour for teachers to come in and work on curriculum integration. But the ideas have to come from the teachers to begin with." The computer coordinator would like to have more funds for this purpose.

Most of the spread of promising practices is done through the Professional Support Staff (PSS), which is directed by the special education administrator.

### 4) Evaluation of Technology Use

There has been no formal evaluation of microcomputer use. The computer coordinator logs the use of the labs, makes graphs of computer use, etc. The timeframe for one set of reports is from 24 to 88 percent. There is also a place for comments such as, "This is fun!!"

## E. Special Education Technology Planning and Evaluation

### 1) History

The special education administrator who preceded the current administrator placed priority on issues other than technology. The current special education administrator is firmly committed to the use of technology, but feels less in control over its implementation as special education administrator than when she was a principal. "The problem is that, regardless of the long-term priorities, the day-to-day responsibilities such as ensuring that all children have proper placements, legal matters, etc. comes first." As a principal, it was more feasible to set up projects and facilitate their implementation, whereas, there is considerable crisis management as the special education administrator; she says, "It's hard to go back to planning and priorities when you're in crisis mode."

In the past, special education planning for technology (and everything connected with it) proceeded separately from planning for regular education. Special education had some of its own funding, so it was easy to overlook their needs in planning. The district has made a commitment not to proceed with any more piecemeal planning, so that special education will be included in all future plans.

The district's first use of microcomputers was in special education for the special schools, moving from special education into the mainstream. This was accomplished as the itinerant and resource teachers took their knowledge of special devices into the schools and promoted their use among regular and special education teachers. (See also IEP software, below.)

### 2) Special Education Planning in the Present

The special education administrator and her staff spent the year assessing their goals and objectives. She believes that the input of her itinerant staff is critical because "everything happens in the schools; it doesn't happen here." Technology increase and improvement emerged as a major priority. There is strong support of the use of computers in instruction and of the placement of computers in classrooms rather than in labs. The goal is to have at least one computer in every special education classroom, which is the first formal planning that special education has done. Most schools in the district have computer labs so that special education students will have access, although it varies by level and teacher interest. She states that the special education program is not reaching its goal with regard to technology use, but that they are continuing to strive toward and refine these goals regarding technology use.

The special education administrator feels that she cannot mandate computer use, in part because there is not enough equipment so that everyone has access. She believes that it is appropriate for her office to suggest, promote, and support use. "If using computers is helpful and successful, then teachers will use them. We can't just have an initiative," she says, "because the response to initiatives is frequently negative." The special education administrator feels that there is a need to have a carefully blended mixture of organized training and informal communication.

As stated earlier, the special education administrator relies heavily on Teacher 1 for advice on technology. Teacher 1s believes that, in large measure, the needs of special education students will be met through access to hardware purchased by and for regular education. The exception will be specialized equipment such as the braille system purchased for blind students. Teacher 1 expects that special education will continue to purchase and distribute this type of specialized equipment.

Teacher 1 believes that planning done specifically with individual students in mind should be a continuing function of the special education group. The hardware will be planned around an individual student's needs. Currently, hardware is given to students for the duration of their school career and returned at graduation. When a student leaves, the hardware purchased for them may end up being shelved and this is what has to be avoided. There is a need to seek ideas regarding a systematic approach to this process, such as cataloging items through the lab and employing a recall mechanism that allows others to benefit from used hardware.

The computer coordinator is an ally in special education use of technology, and the special education administrator and her staff feel fortunate to have him. He works closely with Teacher 1: "We have worked together on several projects at the county level, and we work well together. He's given lots of attention to the needs of special education students. Together, we look at computer implementation from both the technical and the special education perspectives."

There is have a general plan for what they would like to accomplish if money becomes available, which includes supporting computer use by handicapped students in regular and special education classrooms, as well as equipment needed specifically for the special education centers.

For administrative uses, the special education administrator's office is investigating the idea of getting laptops for itinerant professional support staff. The special education administrator will, most likely, get one for the division next year and evaluate its use.

Computer assisted writing for less severely handicapped students who are placed in level 1-4 programs (state-specific designation) in the regular schools is being considered. The special education administrator hopes to develop a model similar to the one developed for augmentative communications for computer-assisted writing, but feels they would need designated equipment to undertake.

### 3) Evaluation of Technology in Special Education

Special education did an access study a few years ago which included a complete computer inventory. Special education also tries to get information informally during workshops and training sessions to find out what is being done with computers in the classroom.

There has been no formal survey of teachers' goals regarding computer technology. The special education administrator for the district does not believe in sending out surveys but needs assessments when there are no resources available to respond to information gathered.

## F. Provisions for Training and Technical Assistance

### 1) Training

Special education has no formal system or established path for training or professional growth regarding technology. "Most teachers are competent, so we let them set their own objectives," the special education administrator says. The special education administrator believes the base of knowledgeable staff that has been developed so far is responsible for the success they have experienced with technology. She feels the staff at the center for severely/profoundly handicapped students is particularly knowledgeable.

Teachers cannot be required to attend training after school or during the summer due to contractual restraints on teachers' participation in training. Despite this, people do participate in training, and there are procedures for applying for and receiving permission to attend training and other professional activities, as well.

The special education administrator empathizes with teachers who teach their students using technology which they are not entirely comfortable with. A considerable amount of less formal training (and spreading of promising practices) is done through the PSS and Teacher 1. They make sure that there are opportunities for people to get together to talk, such as at training events, to encourage teachers to use each other as resources. They ask for both formal and informal feedback when formal training sessions are conducted.

Training in administrative use of computers is done similarly, yet informally. If Teacher 1 does not know the answer to a question, the special education administrator feels free to call the district computer coordinator.

The position of district computer coordinator was established in the 1984-1985 school year as a computer resource teacher and was upgraded to computer coordinator the next year. In the 1987-1988 school year an elementary resource teacher and a district-level repair technician were hired, and the next year, a secondary resource teacher was added. (The coordinator position was vacant that year but was upgraded to the position of supervisor the following year. This person is referred to as the district computer coordinator in this document.)

Formal training is readily available now because resources which the district has received are designated for training. For each school year beginning in 1985, 1986, and 1987, $2,000 was budgeted for training from their own coffers. In the 88-89 school year, the State Department of Education (SDE) gave the district $18,000 for training and in 1989, the SDE gave them another $39,000 specifically for training.

### 2) Technical Assistance

The hardware repair system is informal. Teachers call the repair person personally. "The district is small enough that we can do that. There is a terrific loaner program too, so if your computer is down there is a good chance you'll be given a loaner." One of the lab teachers called for repairs and within hours, the repair person was at the school. The system is excellent, it is quick, and there is little paperwork involved for him. In the summer, the repair person comes in and does all of the maintenance, greasing and balancing the drives, etc. Everything is standardized and registered.

The liaisons in the schools also do some technical assistance. For instance, once there was a piece of software at one of the special centers which proved to be inappropriate because the motoric skills required to operate it, e.g., an elaborate key combination, was required for making a capital letter. The computer coordinator rigged a toggle on-off switch for one young man with head injuries who uses a mouthpiece, allowing him to do control-key combinations on the keyboard.

Special education receives a considerable amount of support and assistance from the SDE. In particular, they are involved in a program to provide technical assistance in augmentative communications. Their liaison with this program is a speech therapist.

The SDE provides training and technical assistance and is particularly good at presenting promising practices. They concentrate their efforts and undertake one area at a time. The current focus of state supported technical assistance is adaptive peripheral devices and augmentative communications devices.

The information developed about augmentative communications was formalized and disseminated and included information about how to access the team for augmentative communications. The team uses guidelines to make recommendations and decisions about committing equipment to an individual student.

## G. Hardware Selection, Acquisition and Access

### 1) Hardware for All Students

The district-level technology committee is responsible for making equipment purchase decisions. Money for equipment is available from the district's budget, from donations and from partnerships. PTAs have also given significant assistance in purchasing hardware and instituting its use. The hardware is inventoried.

The committee has 29 of the 45 schools equipped with computer labs, and the county

is committed to finishing the initial placement of computers in the remaining 16 schools over the next two years. Another part of the plan is to put CD-ROM drives in all school libraries. Two high schools will have these next year.

Placement of technology varies across the district. The county Job Development Center, which operates a vocational preparation program for high school students, has a II+ in every classroom, 11 in the lab (including two IIes) and two MacIntosh SEs. There is also a IIe in Teacher 2's classroom, in Teacher 2(a)'s classroom and in the office. The center for severely and profoundly handicapped students has a single Apple IIe with a color monitor and is equipped with a peripheral switch device on one side. A regular elementary school's technology is placed in a portable classroom behind the main school building. There are five Apple IIg computers on tables and one Imagewriter II printer. All of this equipment is networked using a Digicard Shared Resource Controller.

The computer-student ratio is approximately 1:15 now. The county's budget for hardware is .2% of the district's total education budget. These are significant monies, given the size and funding of education in this county. This figure also does not include the utility company's funding.

There are fewer microcomputers being used in the middle and high schools than in the elementary schools. The middle and high schools have terminals to the mainframe system for administrative purposes. The county is primarily an Apple-based system for instructional use of computers, although the high schools use both Apple and IBM computers for instruction.

There are established standards for hardware; for instance, only two types of networks are supported by the computer coordinator and his staff, which are Apple Talk labs and the DigiCard network. (DigiCard is an Australian network, one of the first labs, and they chose to buy in early.) All requests for hardware go through the computer coordinator.

At first, regulations were not restrictive. In 1983, they put out a bid for the first time, realizing immediately a need for standardization. They held an open Board hearing and had to justify "Why Apple? Why one or two types of hardware?" The computer coordinator then communicates this to the people in the schools. When the PTA says, "Can we buy this [incompatible piece of equipment]?" he says, "No, because this software only runs on certain computers and we only provide maintenance for certain types of equipment."

When one school tried to circumvent the computer coordinator and purchase directly from a vendor, the computer coordinator realized the potential magnitude of the problem. "We couldn't support the (purchased) board," and it caused considerable

problems. The responsible party was the vendor who knew the policy, not the individuals in the school who made the purchase.

Two major hardware projects were started in 1984:

- the [State] Educational Technology Project, which gave them their first computer lab, and
- the local utility project, which began allowing teachers to write grants for computers.

The local utility company project was unplanned. The president of the utility company had a vision of an educated workforce which was needed, but was not being produced by the current education system. The county also needed to attract workers to the area (which would attract customers to the utility company), and the president knew one of the first things people ask about is the quality of the school system. The company had made an error in overcharging their customers and were going to refund the overpayment to the customers. The president had the idea of channeling those monies into the schools, and requested approval from their parent company to implement it. The funds were to be specifically for the acquisition and implementation of technology. He persuaded the Rate Commission of the utility company to allow purchase of microcomputers for schools and hiring of a teacher to run the educational program, which it has become a regular program for the county. The funds are given directly to the school district, but the State has a measure of supervision over them.

By the 84-85 school year, a microcomputer was in every media center. The media specialist started teaching computer awareness courses in all elementary schools, and the computer program mushroomed.

In 1985, a State Educational Technology Network lab started functioning in Middle School A, a lab of 15 Apple microcomputers started in Elementary School A, and a Career Studies/Business lab started in the Vocational Education Career Studies Center. These labs were the product of the efforts of the Board of Education which wanted computer use to focus on writing. The program centered on keyboarding and word processing.

This school year (1989-1990) the science supervisor wanted computer equipment for high schools and approached the utility company's representative with the idea. The representative accepted the idea and the subsequent thinking is being realized, with the acquisition of six computer-based science laboratory and integrated teaching systems at approximately $40,000 each. They include read/write optical drives, color scanners and printers.

### 2) Hardware for Special Education

In the late '70s or early '80s, the State had hired a programmer to write an IEP program for the TRS-80. The predecessor to the current special education administrator acquired the software and Radio Shack Model 3 computers and encouraged its use with the assistance of State funds. The special education teachers immediately realized the value of the IEP program and began using the computers. The software was inadequate (for instance, it was inflexible and teachers could not write their own objectives), but many of the individuals interviewed by the researchers were quick to state that they felt the TRS/IEP experience was a good start at getting special education involved with technology. (A new IEP program runs on Apple II computers, but there is not yet enough equipment for everyone to have access.)

The arrival of the Cristina Foundation computers (Apple II+s) in the school system in 1985 coincided with the first efforts to look at how computers might be used to support the instructional programs of regular and special education students. (The acquisition of these computers was coordinated through the State Department of Education, and the computers were distributed throughout the system.) When the regular education teachers saw the special education teachers pushing Apple computers on school carts, they wanted to take advantage of them too. One teacher at the Job Development center received a grant of 10 Apple computers and with Vocational Education funds, purchased two Macintosh computers.

### 3) Current Special Education Technology Hardware Acquisition

In past years, special education received the majority of its funding through dedicated funds and operated outside the district's technology plan. With the Regular Education Initiative, though, they are integrating special education fully into the procurement process.

The district-level computer committee does not believe, however, that everything has to be compatible. For the most part, special education is allowed to do what it wants with technology.

Grants are the major source of money for equipment and training. Originally, none of the equipment purchased with money from the utility company was allotted to special education, but special education is scheduled to receive computers from this source in the next year or two. Teacher 1 works with the computer coordinator to ensure that special education gets a fair measure of the general technology funds from the district's monies.

This year, special education is receiving money from the State, which is funding a special technology program for special education. Counties have great discretion over this money. Special education also makes use of the Professional Development Center and other county resources.

There is no placement priority between labs and individual classrooms since each classroom has at least one computer. The special education teachers would like to have multiple computers in their rooms, but this idea is not progressing rapidly.

Special education plans hardware purchases around individual students. Teacher 1 expects that special education will continue to purchase and distribute specialized equipment on an individual basis (for instance, a braille system was purchased for a blind student). Students are assessed and tested on different hardware systems. When the right combination is found, the hardware is loaned to the individual student for the duration of their school career and the equipment is returned at graduation.

When a student leaves, the hardware purchased especially for them reverts to the school district. It often ends up being shelved. Teacher 1 feels strongly that this has to be avoided. They are seeking systematic ideas that will, for instance, catalog items through the lab and make use of a recall mechanism so that others may use them, also.

Schools are given great freedom to make their own decisions within the parameters of the district computer coordinator's bounds. For example, at the center for severely/profoundly handicapped students, there is a high incidence of communications-impaired children. A committee consisting of special education teachers was established and received money for purchasing devices. They now develop adaptive peripheral and augmentative communications systems for their severely handicapped students. Students are referred to them and are allowed to borrow the equipment for the duration of their school careers.

## 4) Current Special Education Technology Access

Teacher 1 anticipates that, in large measure, the needs of special education students will be met through access to hardware purchased by and for regular education. All special education classrooms, self-contained and resource room, have at least one computer in each room. Most schools in the district have computer labs, although their use varies according to the level and interest of the teacher, allowing mainstreamed special education students to have access. Self-contained special education teachers in the regular schools also take their students to the labs.

Two high schools still have Apple II+ Cristina labs, but since the equipment is outdated, they lack usable software. One of the labs is used minimally and the other

is not used at all; therefore, the computers are available as spare parts. Special education teachers would happily give up access to all of this hardware for usable software. The district is not allowed to trade-in the computers because they are on loan from the Foundation. They are similarly prohibited from selling other equipment received via grant monies.

## H. Software Selection and Acquisition

District A purchases some software with special education monies in addition to general materials they purchase. Requests for software originate with the teachers, go to the school level computer coordinators and then to the district-level coordinator. The computer coordinator evaluates requests, and based on needs, approves or disapproves them. The approved requests go to the department supervisor for approval. When approved, the district computer coordinator requests a preview copy. When the software is received, the computer coordinator sends it to the appropriate supervisor to evaluate.

Each piece of software received is sent out with an evaluation form. Separate forms are designed for use by staff and students. Evaluation forms are sent back to the central office and housed in the instructional library for future reference. Teachers are encouraged to look for new software that matches their curriculum, and they may recommend a piece of software for county adoption to the appropriate supervisor.

When software has been previewed and evaluated and is acceptable, it is purchased through the office of the district computer coordinator. His office maintains the local education agency (LEA) account for software. His office urges schools to use the same procedures even when purchasing software through funds generated by their school. (If a teacher needs a minimum amount of money for a small software purchase, the purchase may go through the school rather than through the computer coordinator.)

Teacher 1, the District Computer Coordinator and others have collected and evaluated software, but there is no formal mechanism for disseminating information and software. They have found that it is difficult to maintain this system with this type of information, and it operates informally to date. "Our software selection procedures are not perfect, but we've made more right decisions than wrong," the district computer coordinator said.

The district receives a MECC shipment every year and needs to evaluate the programs and place them where they can be most beneficial.

For major purchases, such as networked software costing several hundred dollars each, site licenses are required. For these purchases, committees review the software. Currently, the elementary level language arts committee is evaluating word processing packages which are adaptable to the existing network in anticipation of such a purchase. They will make

a recommendation to the district-level computer committee regarding the package to buy. It is anticipated the best package will cost about $20,000.

At the Job Development Center, the media person identifies the software. She orders 20-25 MECC programs at a time and gives them to Teacher 2. Teacher 2 reviews all the software and identifies students for whom it would be appropriate.

Example: Sources for software acquisition at the Job Development Center

1) MECC: In 83-84, the district joined MECC. Teachers fill out an order form. The school level computer coordinator signs it and sends it to the principal, who signs it and sends it to the computer coordinator. Since MECC software is virtually free, everyone receives copies. "MECC's catalog is the book everyone turns to for software."

2) Classroom money purchases (these programs are inventoried by the media person, and are then given to the teacher who ordered it for use and storage in his or her classroom);

3) Library and general school materials funds. The school computer coordinator receives a specified amount money to spend on software with "school-wide appeal". Examples of such general use programs are talking text writers, graphics packages, etc. These programs are signed out from the collection kept in the school computer coordinator's area and returned there. Teachers also buy programs for specific content with school funds, which remain in the software library in Teacher 2's area.

4) JTPA funds. There are 6 vocational areas. They are allowed to buy vocation-oriented software with those funds, excluding equipment.

In summary, "Teachers are pretty adept at scrounging for software. I hear no complaints," the school-level computer coordinator said.

## I. Classroom Use of Computers

Special education teachers very much want good software, both for instructional and administrative use. The biggest problem they have with software is that it is not compatible with the computers they have. They encountered problems when they updated MECC software. The new versions, which require more memory, do not always operate with older equipment. It has been a hard lesson to learn. Another disappointment they have had is with software provided by the Cristina Foundation. Much of it was inappropriate for their students (e.g., foreign language software and software that has violence as its basis).

## J. Administrative Use of Computers

Special education requires enormous amounts of paperwork for managerial purposes and they need good software so their offices can be automated to meet the paperwork demands. AppleWorks would be appropriate, but it does not function on Apple II+s, which is the equipment that is available; therefore, computer use for special education administration is not a reality.

In the elementary schools, Apples are used for administrative purposes. Word processing and other applications are installed on the personal computers for use in writing memos and reports. Secretaries are also linked to the mainframe at the central office. All records for special education students are maintained for individual and statistical purposes on the mainframe. These include information on handicapping conditions, placement information, tracking information, testing due dates and meeting dates, Individualized Education Plans, etc. Schools send printed copies to the office and the data are entered by the special education director's staff, who are not linked to the mainframe.

The district first became involved with computers through the IEP program developed and disseminated by the State. However, it did not work for them because the operation of the program was difficult. The program they are currently using was developed in-house. It is the most common administrative application used by teachers, although some teachers keep their rosters on the computer, also. Use of the IEP program is optional. It is word processor-based, and, as Teacher 1 readily admits, is not very sophisticated; it does, however, serve the purpose and teachers who use it seem content. It runs on Apple II computers and is very flexible. A teacher can add her own objectives. Its objectives and objectives banks were developed in the school district by elementary resource teachers.

The IEP program was developed in the elementary schools and was piloted for one year. This year (1989-90) it was disseminated more widely. It is being used as the basis for the middle school IEP program which is getting its finishing touches. The high schools and job preparation center are interested in developing their own sets of objectives to use with it too, and related services providers are also interested in developing an objectives bank and using it. A workshop will be conducted during the summer of 1990 to finalize the objectives to be used for students at the job training center.

The IEP program does not have any capability for tracking other data needed regarding special education programs (e.g., student progress, assessment due dates, etc.), nor is it linked to the SSIS (Special Services Information System) program which contains this information.

# II. District B

## A. Demographics

This is a small school district. It has 4,291 students in:

- 7 Elementary schools
- 1 Middle school and
- 1 High school

The State requires a minimum number of students to establish a special education class. If there is less than the minimum number of students with a common learning need, a district works through the county's Intermediate Unit (I.U.), aggregating students to make programs cost effective. The I.U. operates as a liaison between the State and individual school districts for cost-effective programming. There are 29 I.U.s in the State. Roughly, each corresponds to a county. I.U.s provide certain services (e.g., transportation) and are significantly involved in special education. Some of the special education students with low-incidence handicapping conditions who live in the district attend school outside the district, and some of the special education students who do not live in this district are educated here in I.U. supported classes. The staff for I.U.-operated programs are not this school district's staff, in terms of responsibilities and payroll, but are the I.U.'s.

The district operates six self-contained elementary special education classes (all labelled "Learning Disabled"). This district has elementary (I.U.) classes for language impaired students and another for severely and profoundly handicapped students. Also, they have an I.U.-operated diagnostic kindergarten in one of the elementary schools. Many of the Educable Mentally Retarded (EMR) students in the county are in this district. One school has three elementary EMR classes. The district operates one self-contained middle school classroom that serves Educable Mentally Retarded (EMR) students, and the Intermediate Unit operates another. There is no district-sponsored, self-contained class at the high school level, but the I.U. has a self-contained EMR class there.

The socioeconomic profile of the community reveals it is suburban, middle-income and working class. The racial composition is approximately 75 percent white, 20 percent black and 5 percent other.

Regarding the teaching and administrative staffs, there is very little turnover in this district. One staff member who was interviewed commented that the district was "parochial" and many of the staff were "entrenched." Another stated that, although he had been here [over ten years], he was still considered an outsider. Many of the professional staff are graduates of the district's high school, and many were around during earlier attempts to bring

technology into the district. While people may complain, researchers were told by yet another interviewee, they rarely leave.

District B is a low technology-using district but is now actively involved in increasing its use of technology.

## B. History of Computer Technology Use

Briefly, computer use was on the increase 10 years ago when a science teacher and a math teacher showed intense interest in them. The district made an investment in TRS computers. When the individuals responsible moved up and out of the classrooms, though, interest lagged and the early surge of interest dissipated. Computers continued to be used in the Business Department at the high school level, for programming and keyboarding, but that was the extent of their use with students.

There are sensitive feelings on the part of individuals from earlier attempts to install computers in the middle and high schools. The high school, several years ago, established a committee as they had been instructed to do by the administration and had a few meetings. In these meetings, they identified issues and raised questions, but then they did not know how to proceed. The committee felt it was not supported in its attempts to bring the district up-to-date vis a vis technology. In another situation, the middle school principal asked for a lab but had no plan for it. The district computer coordinator wanted the principal or someone on the staff to sit down and develop a plan for its use once they acquired it, but the principal resisted. The district computer coordinator was willing to work with the principal but felt strongly that there needed to be ownership of such an enormous project. She was strong-willed about the sequence that would have to be followed in order to get the lab.

In another instance, one of the committee members failed to take the needs assessment back to his department altogether, and in brief, failed to participate. The last meeting, however, he raged that his department was left out of the planning. Others at the high school perceived that the decision making body* had made its decisions regarding what would be purchased and the ways in which technology would be integrated into the curriculum. Members representing the high school wondered why they were wasting their time.

There have been several attempts to implement technology use in the district prior to the current effort. One attempt included establishing a technology committee composed of the cabinet level staff, but they were unsuccessful. They realized they needed to hire a full-time district computer coordinator and did so this year. They made a large investment in

* The decision making body is formally called the Cabinet. It is composed of the Director of Instruction, the Director of Administration for Business, and the Director of Administration for Personnel.

hardware this year and anticipate making similar large expenditures over the next two to three years. They are simultaneously focusing their efforts on software and integration of technology into the curriculum, pushing hard to regain lost ground. Overall, activity has increased substantially.

In the current attempt to bring technology to the classroom, the district computer coordinator did a needs assessment at each of the three school levels, requesting their input. Committees were composed of members representing the different departments and administrative staff. Working with the district computer coordinator, individual plans were drawn up for each of the levels. There is some recognition that computer use in the lower grades will influence their use at higher grades, and attention is now being directed to technology use across the K-12 curriculum. (For instance, the fact that children are learning keyboarding in fourth or sixth grades replaces the need for keyboarding instruction in tenth grade.)

The elementary schools are the only ones in the district where the technology effort is fully underway. Enthusiasm about technology is on the rise at the high school level, due to the fact that three Macintosh labs will be installed next year. The middle school has little recognized enthusiasm for technology implementation efforts.

## C. The Key Players

### 1) The Special Education Administrator

The special education administrator has been in this school district for 34 years. He was reared in a major city in the State. He began as a regular education junior high school teacher, teaching a variety of subjects. He later worked with Chapter I students and became a counselor. Later still, he worked for 10 or 12 years as District B's educational psychologist and then as the assistant special education administrator. The 1989-1990 school year is his first as special education administrator. (For this reason, he cautioned us, many of his comments are based on expectations and knowledge of the community rather than direct experience as the administrator for special education programs.)

The special education administrator expects to be involved in planning related to technology. He would like to pursue some grants. "If the teachers want to get involved with computers, I will encourage it," he told the researchers. He "supports teachers in their efforts," but does not take an active role in pursuing uses of technology. Although his predecessor had an assistant, he does not. On occasion, he uses a psychologist as an assistant.

He has been so busy that he has been unable to become involved in the technology initiative. "I can't even get into the classrooms, I'm so busy." Currently, he serves on the Professional Development committee, the Student Assistance Program, Drug and Alcohol Counseling, the Superintendent's Planning Committee, and the county-level Special Education Committee. He spends "much time in many meetings."

"Things have been in turmoil" since he took the position, due to wide-ranging changes in State regulations and standards. Changes to State regulations affect IEP development procedures, the role of multidisciplinary teams, transition planning and early intervention programs.

Finally, the special education administrator notes that the role of the special education director in the district has changed in recent years with the school-based management initiative. He does less day-to-day oversight of special education programs since these responsibilities now belong to school principals. His position involves more planning, developing and implementing programs, due process, placement and compliance with the law and the regulations implementing it.

### 2) The District Computer Coordinator

The position of district computer coordinator is new this year, as is the woman who fills the role. Prior to coming here, the district computer coordinator did inservice training for principals at the county level. Following one of these meetings, the director of administration for business approached her regarding a staff position. The position of planetarium director was created to bring her on staff and cover her position half-time, since they believed they could not justify a full-time computer coordinator. She believes the district woke up, looked around at what was happening with technology elsewhere, and realized they were being left behind.

The district computer coordinator would like the integration of technology to be a team effort but readily admits it has not been, so far. She has been moving quickly since she came on board, and the solicitation of input from teachers is a luxury she has not be able to afford. She would like to spend time with teachers, gaining their input, observing them in their classrooms and identifying needs for which technological solutions are appropriate and cost effective. She expects, in the future, to have more opportunity to solicit and act in support of teachers. Ultimately, she wants her role to be one of empowering teachers to move forward with ideas and actions that use new methods of pedagogy to increase their effectiveness in teaching.

The philosophy of the district computer coordinator is one of expanding the teaching pedagogy and equipping teachers with additional tools to increase their effectiveness. The district has made a major hardware investment, but the implementation of programs which make use of all this hardware is just beginning.

An example of this philosophy is the installation of publication centers in the libraries of every elementary school. The district computer coordinator believes that teachers need to have computers available to them at all times. Her strategy is to get the teachers using the publication centers first for their own use, to begin feeling comfortable with them. Then, she believes, teachers will begin to identify uses for their students to use computers.

The district computer coordinator coordinates all hardware and software purchases in the district, all training, and the implementation of all plans concerning technology. The sole area of technology for which she does not have responsibility is the mainframe computer which supports many of the district's administrative computer-related functions. In addition to these responsibilities, she is creating and refining procedures for all facets of computer use and operating the planetarium.

## D. Committees

### 1) District-level

There is no district-level technology advisory committee which brings together people from different levels of the system. At a formal level, planning is handled by the cabinet level administrators in the district. The cabinet level administrators are:

- the director of instruction,
- the director of administration for business, and
- the director of administration for personnel.

The district computer coordinator, the director of instruction and the director of administrative services for business are the informal "core group" for technology planning. The district computer coordinator reports to the director of instruction, and the district-level technology committee reports to the superintendent. The director of instruction has recently absorbed special education into his authority, and he supports the Regular Education Initiative. The director of instruction is the "dominant force" in technology. He supports the district computer coordinator in her technology efforts and is educating himself on the issues.

The district computer coordinator believes that in the future, as school level committees develop and committee members become more knowledgeable, some decision-making will be moved to school level committees. For the present, she gathers information from her school-based coordinators and conveys it to the members of the cabinet.

## 2) School Level

Each of the schools has a technology committee. The functions of the committees are to acquire software, maintain software and hardware, provide training, and disseminate information about computers to the rest of the school. The district computer coordinator tries to ensure special education representation on each committee.

In addition to the school level committees, the elementary schools have an elementary school coordinators' committee. It is composed of seven teachers (one from each school), the special education representative, and the district computer coordinator. This committee met six times during the year of the interviews for a total of approximately 15 hours. The district computer coordinator suggested they would be meeting even more the following year, as they got further along in the process of integrating computers into curricula.

Each school is supposed to have a building computer coordinator, as well as a single individual to whom teachers can turn for help. The person designated as the school computer coordinator is responsible for smooth running of the technology on site, which includes training and simple technical assistance. Each building computer coordinator makes him or herself available one morning or afternoon each week for staff training. In addition, these teachers plan and conduct training at an inservice each April. The district computer coordinator believes these positions, to date, are critical for the success of technology implementation in the elementary schools.

The role of the elementary school coordinators has greatly expanded, and the district computer coordinator believes that for the next four or five years their responsibilities will be heavy. The day she was interviewed, the district computer coordinator was meeting with the director of instruction to make a case for the special education representative to the elementary school computer coordinators' committee who receives "pay and status" equivalent to that of the other teachers on the committee. (The compensation is composed of both money and continuing education credits.)

The middle school and high school technology advisory committees are in charge of providing the same services as the elementary school technology committee, getting software, maintaining software and hardware, providing training, and disseminating information about computers. No inter-school committee is needed at the middle or high school level, since there is only one of each in the district.

There is less enthusiasm at the middle and high school levels, which may be due in part to less technology availability there. For example, there are approximately 15 members on the middle school computer committee, but only five members attended the last meeting. The district computer coordinator admits they are having some problems getting technology off the ground in the middle school. She tried for

months to get the middle school committee together, and when it finally did meet, there was little staff participation. This may have been due in part to the presence of the principal. When he was called away, teachers' participation increased.

The first meetings of the committees at both the middle and high schools were very awkward, but people are more relaxed now. The district computer coordinator noted the change, visible in people's body language, and said it made her feel like she was making some progress. This change is particularly apparent in the high school committee (which has 20 members). The staff there is getting excited about the three Macintosh labs being established in the school. This is the district's main focus for the 1990-1991 school year. The district computer coordinator feels very good that the committee is thinking more like a team in the last few meetings than they were before.

There is not a special education representative on the middle school committee, but there is one on the high school committee. All subject areas are represented on each. There appears to be no coordinator at the middle school, either.

## E. Technology Planning

Decision-making occurs following this path: The district computer coordinator gets input from the committee meetings at the school level and the cabinet, through the Director of Instruction, gathers data from school-based administrators. The district computer coordinator does any other research that is required, and makes recommendations to the cabinet. This information is incorporated by the cabinet in its planning and decision-making. They give the district computer coordinator their decisions and she implements them.

In the elementary schools, there are curriculum committees for each content area. In each, there are two curriculum coordinators who report directly to their appropriate supervisors. The Director of Instruction supervises these curriculum committees. He attends their meetings when possible, listening and giving input into their work. Special education has a representative on each curriculum committee. The special education representatives can report their activities to the special education administrator, but we did not hear from the special education administrator that they had done so. No special education-specific plan has been created for this district, because of the district's support of the Regular Education Initiative. The director of instruction and the district computer coordinator both feel that planning for special education use of technology should, for the most part, take place within the regular education program.

The district has adopted the whole language approach to reading and writing. A small group of teachers working with one of the language arts coordinators is modifying the language arts curriculum now and identifying specific software which would support the

whole language approach. This group is also drafting a set of guidelines which can be used in other disciplines as they go about seeking ways to integrate the computer into the curriculum.

## F. Hardware Selection, Acquisition and Access

The district is "looking forward to significant purchases of computers over the next three to five years," the special education administrator told the researchers. In fact, because of the rapid influx of equipment, there will be approximately twice as many computers in the system at the beginning of the 1990-91 school year as there were at the end of the 1989-90 school year. The district computer coordinator has wondered, at times, if they are getting too much equipment too quickly. She is having difficulty keeping up with the training to get the hardware into use.

When asked how they made the decision to become a predominantly (though not exclusively) Apple district, the district computer coordinator said that industrial arts and business education were particularly interested in establishing continuity between the computers used by students in school and those that they would be using in the real world. This narrowed their selection to the Apple Macintosh and the IBM, and they investigated each in depth. In making their decision, they noted that Apple's presentation, pricing structure, training, service, and support were superior to IBM. In addition, the Macintosh offered ease of use and the ability to transfer acquired skills across applications, which would ultimately translate into less training, a benefit the district sought. The district computer coordinator is not averse to having some MS-DOS machines in the district (e.g., in business), and is looking into getting additional machines through private funds.

The elementary schools currently have Apple IIe and IIgs computers. The goal for the 1991-1992 year is to have one computer in every classroom. Currently about 55 percent of elementary classrooms have a computer, although all the classrooms have a computer at least part of the year. The district computer coordinator believes that the elementary schools are not yet ready for labs. She feels the schools need more equipment and more teacher experience before a lab arrangement would be appropriate at the elementary level, but she believes eventually they will get the labs, probably Apple IIgs. She believes that when these labs are installed they will be for a specific purpose (e.g., a writing lab) rather than for general purpose.

At the middle school, technology implementation is very limited. The computer coordinator is working with an assistant principal on all technology-related issues. The first real acquisition of technology was 12 Apple IIgs computers, a laserdisc player, and other equipment, acquired through a grant proposal initiated by the head of the science department. These models have only 5-1/4 inch drives and only 256K of memory. One problem with this independent acquisition effort is that some software requires disk access during operation. It is usable then on only one computer at a time, since only one copy

was purchased. Other software available is the *Optical Data Science Series*, *ABC News Interactive*, *Vote '88* and *The Holy Land*. This is all of the optical storage media in the district, besides the CD-ROM discs in the library. (A lot of poor quality drill and practice science software was also purchased with this grant money, researchers were told.) They recently had a 25-computer lab installed.

The high school focus is more on teaching applications to students. There is very little hardware in the high schools, but next year, three Macintosh labs will be installed. Those involved with the installation of these labs are very pleased they were able to stave off "parochial" or "territorial" interests and make the labs available for all subjects. One lab is primarily for use by the math department, one for the business department and one for language arts. Special education students at the high school who are mainstreamed will have access to these labs through their mainstream classes.

The district has begun to look at how computers can be used for instructional preparation and to improve presentations using mobile systems with large screen setup. They currently have mobile technology stations—one for social studies and two for science. Each station is composed of Apple IIgs computers with color monitor, an overhead projector and LCD computer screen overlay, a videodisc player and its monitor. They are used for multimedia classroom presentation, using ABC News and the Optical Data Science program. They are starting small, but believe these stations may prove very useful.

There have been some special education grants for hardware and software purchases. Special education students in the high school are largely mainstreamed. Some of these students are mainstreamed for a portion of the day, and they have access to district-purchased computers if their mainstream class uses them. If entirely self-contained, though, students in I.U.-sponsored classes have no access to district technology. This is a problem that the district computer coordinator plans to investigate.

In general, the I.U. does not provide technology, although "occasionally a supportive supervisor will provide technology for an I.U. teacher." For instance, for one visually impaired student, the I.U. provided special software and an Echo speech card. For another student with encephalitis and gross and fine motor skills impairment, they purchased a mini-keyboard with keyguards to facilitate his use of the computer. Generally, though, there is no technology support for the I.U. classes despite the interest of I.U. teachers in using technology with their students. Although the district computer coordinator cannot provide them with equipment, she has duplicated MECC software for them to use with their students on the equipment they have been able to acquire through other means.

Teacher 2, a special education teacher, received her classroom computer setup four years ago through a $4800 Cycle 5 Special Educational Minigrant awarded by the State Department of Education. She wrote the grant in 1986, and received her computer setup in 1987. The grant included an Apple IIgs, an Imagewriter II printer, an Echo speech synthesizer, *Muppet Learning Keys* touchpad, and a set of software specified in the

minigrant proposal including 15 packages from Laureate Learning Systems and Sunburst software. (Teacher 3 received a Cycle 5 Special Education Minigrant from the State, also, for social studies and map skills.) The terms of the grant are that the hardware belongs to the State, but that it will remain with the program throughout its useful life. This grant program was discontinued in 1989.

Among the six LD special education classrooms in the elementary schools, there are four Apple IIgs systems, the two minigrant systems and two others that were funded by CETA. Only the minigrant systems have printers. At the time the minigrants were awarded four years ago, those computers were the only ones in the building.

## G. Software Selection and Acquisition

Until this year, teachers submitted purchase requests directly to the director of administration for business to order software, and paid for it from their classroom instructional materials budgets. The district has now joined MECC, and teachers can order MECC software through the computer coordinator in their building. [In responding to the interview, Teacher 3 stated that she had also recently purchased software with her own money.]

Once a month the computer coordinator places an order to the district computer coordinator. The disk and manual, when received, are sent to the teacher placing the request. Teachers may keep these copies of MECC software in their classrooms permanently.

Software in the school is located in one of three places:

Individual classrooms - for a teacher's individual software collection;
The teachers' workroom - teacher oriented software, primarily useful in materials preparation; and
The library - MECC preview collection

This year, the new district computer coordinator bought the site license for MECC software for the district. The MECC license significantly increases the amount of software available for teachers to use on their classroom computer. Other software is ordered through Troll and other resources.

A nearby Regional Resource Center, a software preview center, is sometimes availed upon when teachers are looking for software. It is used when the need to investigate a variety of software is needed. For example, when writing their grant proposals, Teachers 2 and 3 were paid to go to the center to locate appropriate software.

## H. Provisions for Training and Technical Assistance

The district coordinator believes training is moving too slowly, but admits she feels you can never go too fast on training. The year following the interviews, inservice training was to be devoted to technology altogether. This involves three days of building training and five more of district-level training.

The district computer coordinator believes that ongoing, building level training is "more viable, practical, and meaningful" than one shot training done by professional trainers. One of her goals is to get money to buy time for training and conference participation by teachers. (Conference attendance was already on the rise. The district computer coordinator felt strongly that teachers locating, evaluating, and asking for software or hardware was the single best vehicle for a successful integration project.) Once the labs are established at the middle and high schools, training will be greatly facilitated. It is difficult to train a large group in exercises that are "hands on" when she has very few computers at her disposal.

The building computer coordinators at all levels were invited to take computers home over the summer in order to become more familiar with them. There are established levels of competence for the building computer coordinators, and the district computer coordinator believes it will be another four or five years until they are all operating at the highest level.

The teachers agree with the district computer coordinator in placing high value on training. There was an 87 percent return rate on her training needs assessment conducted the year of the interviews. Two-thirds of the 150 elementary and middle school teachers returning questionnaires said they would be interested in training.

In response to the needs assessment, training was planned. It will be conducted after school, and there will be a small charge so that the teacher-trainer can be paid. Teachers will not be paid for attending. Training sessions for K-8 teachers will be held two or three afternoons per week in the middle school lab.

The elementary school computer coordinators (members of her committee) support the district computer coordinator in her training efforts at the elementary level. School computer coordinators make themselves available one morning or afternoon each week for technology-related training and other assistance. Elementary school computer coordinators were so enthusiastic about their computer responsibilities, they were told to limit the amount of time they spend on computer-related activities. Their efforts have paid off, though. In the training they give, they receive "rave reviews."

Teacher 2, who is a special education teacher, and the special education representative to the elementary school computer coordinators' committee who is not a school computer coordinator, also gives informal staff training every Tuesday which is open to all staff. Her training, too, is well received.

This year the district computer coordinator's goal for the elementary schools was to get every elementary teacher involved and using computers. Overall, the effort was successful. In the schools with a strong coordinator, teacher training is especially good. People who never used computers before have started to use them. Next year the district will have more inservice and will train trainers to train the teachers. Teacher 2 believes that most teachers are not afraid of the computers anymore. Now that they are able to use simple drill and practice software, the district computer coordinator wants to expand uses to include tool use (e.g., word processing) and to integrate computer activities into the curriculum.

Generally, the district computer coordinator has observed that teachers prefer informal mini-training sessions over formal, for-credit courses. Therefore, teacher trainers will provide instruction in "basic comfort," word processing, elementary desktop publishing and other tool software. She believes that they need to have six or seven standard training modules for elementary and middle school and three or four for Mac training at the high school. One of the reasons the district decided to purchase Apple computers was this transference of skills from one piece of software to additional software packages.

The publishing centers at the elementary schools are intended as a place for teachers to use computers for materials preparation. Most of the materials are oriented to teacher needs, that is, materials development. However, some of these can also be used by students for instructional purposes. Software can be borrowed for two weeks at a time to use in the classroom. There was an inservice conducted by the computer coordinators about *Children's Writing and Publishing Center* this year. All elementary education teachers attended. It was a half-day inservice, to show the appropriate use of the program in the classroom as a publishing tool for the teacher.

The building coordinators in the middle and high schools work through liaisons in each department. The need for training in the middle and high school is great, but the district computer coordinator notices a reluctance to provide funding for training and technical assistance. One of the big obstacles to overcome to make this technology infusion effort successful is teachers' attitudes. The district computer coordinator thinks that, rather than feeling empowered, teachers are skeptical of technology. Many were in the school district when earlier attempts were made and saw their failure. They feel the time and effort being devoted to technology is excessive, and they do not perceive a sufficient return on the investments.

Their Apple vendor has done most of the training of the clerical staff for the newly acquired computers, which has been mostly introductory lessons. The district computer coordinator plans to ensure that clerical staff is included in future technology training. The district computer coordinator is also investigating self-training (e.g., audio and videotape) for applications.

Currently, they have no mechanism for sharing the interesting things that are happening in isolated pockets in the district or in the world at large. The district computer coordinator assumes responsibility for this situation. The district computer coordinator would like to begin producing and distributing a newsletter to communicate information about technology to teachers and others involved in technology use in the district, but it does not have the priority of other tasks. She is not sure if this will be possible in the near future.

In February, 1991, the Professional Development Committee will sponsor a "Technology Awareness" miniconference to inform and gain the support of school board members, administrator and teachers by highlighting programs in the district. The district computer coordinator is encouraging this, both to raise awareness and to instruct on "best practices" in the district. The presenters will mostly be teachers.

The district computer coordinator is the sole technical assistance person in the district. She is aided on site by the building computer coordinator, but for the most part, she is the person called when computers malfunction. The IBM computers in the district are serviced by the IBM representative.

## I. Classroom Use of Computers

### 1) The Special Education Administrator's Perspective

The special education administrator hopes to see the use of computers in special education increase significantly in the future. Currently, he sees very little happening at the middle school and less at the high school in special education classes. He would like to increase use over four or five years, as the curriculum coordinators gradually increase their involvement in the subject areas. The special education administrator feels strongly that teachers should be spared any "trauma" from technology implementation.

The special education administrator believes that regular education and special education in this district have about the same access to equipment.

He thinks that the use of word processing is one thing that special education will strive to increase. However, he does not want to see any significant decrease in the amount of direct instruction as a result of the use of computers with students. He thinks that in the primary classes (for example, Teacher 2's class) computers might be useful for direct instruction, perhaps using drill and practice software. "I understand word processing and writing go together, but I still think that we need direct instruction using computers."

As the special education administrator phrased it, "If [the primary special education teacher] had older students, she would probably use them more because the computers would be more appropriate. The level of her students is pretty young, but the older students, who have developed individual working habits, would use them more."

## 2) A Middle School Teacher's Perspective

Teacher 1 described for us the difficulty that she has in obtaining equipment. There are no computers in the Special Education department in the school, so she begs and borrows to get computers to use with her students. The most convenient location from which she can borrow computers is the science department. The science department has about 10 Apple IIgs computers, but they use them almost every day, so they are not available to her on a regular basis. There is no formal sign up procedure, so at times, she thinks she will be able to use some computers in a class, but it turns out that she cannot. When this happens, she has to cancel the computer-related activity that was scheduled. If she cannot get them from science, she has to borrow them from a department upstairs, which means that she has to get the freight elevator key and get her students to help move the computers down to her classroom. The library also has computers, but they too are difficult to access.

Regarding technical assistance, there is no officially designated computer coordinator in the building. One of the science teachers formats Teacher 1's disks for her and provides technical assistance as she needs it. The math and science teachers who provide technical assistance in the building are knowledgeable, and Teacher 1 is in close proximity to them, which facilitates receiving assistance. The problem is that these science and math teachers were scheduled to retire at the end of the 1989-1990 school year, and Teacher 1 believed this would cause significant problems for her because they have been her primary sources of technical assistance.

Out of the 66 teachers in the school, Teacher 1 estimates that about 25 percent use computers. The only regular users are the math department (including computer applications), the science department and Teacher 1. Among the nonusers, there are some phobics, but most teachers simply do not see the benefit of computers in their programs. Social studies, English and most Related Arts teachers did not use computers in instruction during the study. However, in later correspondence with the researchers, Teacher 1 reported more teachers were trying activities with computers.

For the class observed by the researchers, Teacher 1 had two Apple IIgs systems on lockable rolling carts borrowed from the science department. Each computer had two 5-1/4 inch drives and an ImageWriter II printer.

Teacher 1 says that the students now entering her class come with prior computer knowledge, and they help her with the technical aspects of using the computer. Students work in pairs using *The Game Show* from Advanced Ideas. This program has multiple topics, all having to do with language. The focus of this lesson is homonyms, so the students work in a portion of the program which deals with homonyms. In this program, there are graphic characters representing two contestants and a game show host. Students are given clues and have to guess the word that is also a homonym. The game is fairly difficult, in part because the clues given are not particularly helpful. The students persevere, although at times they seem frustrated.

One of the computers malfunctions. After repeated attempts to reboot the software on the malfunctioning machine, Teacher 1 puts the students in teams to work together on the one working computer. A researcher suggests the malfunction may be simply because the computer requires an original disk as a key to get it started. A disk switch makes the second computer operate correctly, and students go back to working in pairs on both machines.

### 3) An Elementary School Teacher's Perspective

Teacher 2 teaches a self-contained class of LD students in grades 1 - 3. She was one of the minigrant recipients four years ago. Originally, she expected to use computers primarily for drill and practice, but she is pleasantly surprised that she is using tool and simulation software and integrating the computer into her curriculum.

On the day of the observation, the students were using *Muppet Slate*, a large letter word processor with a clip art library and a set of page borders. This software makes it possible to illustrate writing projects easily. Although the word processor can be used with the standard keyboard, Teacher 2's students are using it with the *Muppet Learning Keys* (a touchpad on which the letters are arranged in alphabetical order), rather than the standard keyboard arrangement. Teacher 2 likes this input device because the students are able to complete their work more quickly. (Teacher 2 also uses *Children's Writing and Publishing Center* from the Learning Company. This is a more sophisticated program, intended as an introduction to desktop publishing. The district purchased this and distributes it, with each building receiving three copies.)

Teacher 2 says that she has been using computers in instruction for five years. Excited about technology, Teacher 2 has taken courses from State-sponsored training events (for continuing education credits), from a nearby private university (graduate credits) and a community college (undergraduate credits). As she progressed, she thought using computers would be great for her students. She thought that the computer would be like "another teacher" in the classroom, so she wrote the minigrant proposal. Having the computer in her classroom has fulfilled her hopes.

## J. Administrative Use of Computers

At the Administrative offices, there are seven Macintosh computers, a file server and a laser printer. They are not networked. These are for the support staff and the district's internal research group. All clerical staff and most administrative staff in the central office are using computers. Most administrators have a computer, including the superintendent, but the director of special education does not. They are used primarily for clerical and business support.

Administrative uses of computers in the schools include use of database, spreadsheet, word processing and desktop publishing software, primarily for materials preparation. The district computer coordinator believes that they will continue to keep records, grades and attendance on the mainframe since it is working well.

Elementary principals have access to computers, although they may not be available for their exclusive use. There is one Mac in the elementary schools. Most of the elementary schools still have Apples (II+, IIe, and IIgs) in the office. The district computer coordinator is helping the offices to automate. All schools will have Macintosh computers as soon as the order arrives (expected in January 1990).

In the middle and high schools, Mac computers will be put in offices for use by the support staff. The middle school has a single Mac, but no one has been trained to use it. The high school has two Macintoshes in the main office and will soon be getting two more for the secretaries to use. The guidance secretaries in the high school also have Macintosh computers, and there is a laser printer in the main office at the high school. Some schools still have TRS-80s, and are still using them, until January 1990. They have dumb terminal links to the mainframe and Macintosh SEs. The middle school and high school interface directly with the mainframe for scheduling and attendance. The mainframe computer room at the district offices is managed by the office of the director of administration-business.

# III. District C

## A. Demographics

District C has 3,770 students in:

- 4 Elementary Schools (grades Kindergarten through six)
- 1 Middle School (grades seven and eight)
- 1 High School (grades nine through twelve)

District C has many resident senior citizens and is relatively affluent. Although many citizens send their children to private schools, District C is recognized as being a very good district. The per pupil rate for a student in a District C public school is $5,400 per year.

The population of District C is growing and changing rapidly. Until recently, District C was a very racially homogeneous district. Now, African Americans, Hispanics and Asians are moving into the area in large numbers. There are also children with AIDS, children who are drug-affected and children who are otherwise affected by violence or abuse appearing in the classrooms of District C. "The climate of schools has changed dramatically. We are dealing with major problems—substance abuse, sex, mental problems—that are manifesting themselves daily in the classroom."

The special education population is growing, too, by leaps and bounds, largely with lower socioeconomic level students. In fact, the district has made a request for another full-time special education teacher to begin a new class in one of the elementary schools. Many of the teachers in the district are not accustomed to working with students who are racially or culturally different from themselves. They tend to assume that children live in two parent households and come to school having eaten breakfast. The district is adjusting to the influx of students with diverse backgrounds and needs.

Special education students are enrolled primarily in self-contained special education classrooms. There are three types of classrooms in which special education students are served in the district:

- Perceptually impaired (PI) self-contained classrooms are for learning disabled (LD) students for whom there is no known organic cause of the learning disability. Included here would be students who have familial dyslexia.

- Neurologically impaired (NI) self-contained classrooms are for more severely learning disabled students. To be in an "NI" classroom, there must be evidence of significant neurological problems documented in a physician's report.

- Resource rooms are for students, NI or PI, who can succeed in the mainstream with some support.

State law specifies that there must be at least four students within a four-year age range to set up a program for that classification. The relatively small size of District C dictates that it take advantage of this. Very low functioning students and students with low incidence handicaps, visual or hearing impairments, orthopedic handicaps and emotional or behavioral disorders, go to facilities in nearby school districts.

Child Study Teams refer children to special services. Child Study Teams are made up of three professional staff members—a psychologist, social worker and learning consultant. Their mission is to service all students with special needs, i.e., all students who are "at risk," not just students with handicapping conditions. There is one team for the high school, one for the middle school and one for the four elementary schools. These teams report directly to the special education administrator.

Child Study Teams are currently disbursed throughout the district where there is room for them (for instance, the Child Study Team for the elementary schools is currently located in the central administration building where the special education administrator's office is). Next year, all teams will be located out in the schools. The special education administrator believes that the presence of the teams in the schools will promote their involvement in the schools and enhance their ability to support all students.

District C is a relatively high technology-using district and is experiencing a great deal of growth with respect to technology use.

## B. The Key Players

### 1) The Special Education Administrator

The special education administrator was originally trained as a nurse. Returning to graduate school to train as a pharmacist, she met a woman with a severely handicapped daughter, and they struck up a friendship. The special education administrator was enamored with the dedication of the teachers who served special education students and the rapport between them and the students. She decided, instead, to pursue training in special education and went to work in a urban school district with 12,000 students who were eligible to receive special services.

In this position, she was not involved with technology adoption and did not use computers in her job. She did, however, design a computer-training program for summer youth employment. This program involved training students, both in a district classroom and in a Radio Shack training facility. The special education administrator coordinated the project and was trained along with the students.

Also, the special education administrator found that many students who were severely handicapped and placed out of the district often had access to computers in their private placements. The students enjoyed using them, and the special education administrator encouraged parents and private schools serving the children to purchase them whenever possible.

The special education administrator left that district to work for the State Department of Education from 1983 to 1987. She was in charge of monitoring special education program compliance in 20 school districts in the State and was involved in a project to computerize all special education data at the State level in order to produce needed reports.

The special education administrator returned to the school district she had originally worked in as its director of special education. Based on the success of the earlier computer training program, she pushed for all of the special education teachers in the district to get the training, located the funds to pay for it, and made it mandatory. She also got computers for all special education classrooms and was very much involved in an IEP-system development project in this district. During this same period, she brought a microcomputer for her home.

The special education administrator remained in the other district until she came to District C as its special education administrator. At the time, District C was having difficulty complying with the special education laws. Because of her State-level experience, she was very familiar with the rules and regulations.

The special education administrator is new to District C, having assumed the position less than six months before the interview. She strongly supports the Regular Education Initiative. She also believes that special education should be serving only "truly" handicapped students, those who meet the legal definition of "handicapped" in the federal regulations. The others—those who are culturally different or at-risk—can best be served in regular education, with support. She feels strongly that regular education has the responsibility to serve handicapped students, and that special education can play a crucial role in advising regular education teachers about teaching learners with special needs.

The special education administrator believes the district needs to make better use of its Child Study Teams. She believes that many students who are referred to the Child Study Teams are not in need of special education. She thinks the teams

classify students because they believe the students need extra support to succeed. The special education director believes that instead of classifying them, the teams should support regular classroom teachers in dealing with hard-to-teach or "at risk" students.

The special education administrator would like to bring back some of the students with behavior disorders. She believes that the children who are labelled BD in District C are the norm in more urban and more heavily minority areas. She believes that many of these students would not be identified as needing special education in more urban areas. To a large degree, she believes, the teaching style of many teachers is simply uninteresting and inappropriate, and teachers can and should be trained to be more flexible and engaging in their classrooms.

In negotiations preceding her employment by this district, the special education administrator told the superintendent that it was her plan to take charge and make changes happen. His favorable evaluation of her performance indicates his support for her attitude. She has the authority and responsibility to use her budget as she sees best. Rather than sitting on the sidelines and waiting for a decision to be handed to her to implement, this special education administrator takes positions on issues. She regards this take-charge style as a strength. "I have broad shoulders on which both accolades and criticisms fall," she says.

The special education administrator sees herself as an advocate for the special education students in the district. "If I'm not an advocate for these kids, who will be?" If policies exclude students from things they need, and she can't resolve the conflict, she does not hesitate to take the discussion to the next level up (the superintendent). What drives her is "what's good for the kids."

The special education administrator finds the pace in District C slow compared to what she was used to, but she believes that once she is "up to speed" she will have the opportunity to plan here, rather than just react to events or fight fires. She believes that "we have the means to do the job well" in this district. Limitations to planning and implementation are financial only. "It's costly to be innovative and creative," but "we have good programs, satisfied parents and on-the-ball teachers."

The special education administrator has both professional and personal usage of computers in her experience. These include producing correspondence and reports, maintaining a database of audiovisual materials and managing her personal budget.

The special education administrator believes that there are major needs driving computer use in special education, although she has not yet had a chance to get involved in computer use by special education students in the district. For teachers and administrators, she understands that computers can help as an administrative tool, e.g., to keep attendance records, to do district-wide processing of various kinds of

data and to otherwise manage extraordinary paperwork demands. For students, who will certainly be faced with computers in the future, they can act as a motivator, teacher and tool, as well.

The special education administrator's interest is in what can be accomplished with technology, more than in the technology itself. "They're [computers] just a means to an end." The special education administrator does not have a computer in her office but can use one of those in the outer office when she needs to. She feels that this kind of availability meets her needs for computer access, and she does not foresee getting one herself in the near future. More importantly, she has arranged for each of the secretaries in the special education office to get a computer next year.

The special education administrator says that, to date, in her career she has only been involved in technology planning for special education. She believes that once she has had an opportunity to learn her job and the district well and to straighten out some problems within special education, she will get more involved in general district planning.

To accomplish large-scale change, the special education director believes in bottom-up planning. "We can't create change without giving people the opportunity to have input." But she also realizes that, at times, a program needs to be put into place quickly and modified later until it works just right. She believes that it is always possible to incorporate input later in the process as the initial solution is modified and perfected.

The special education administrator wants students in self-contained classes to be involved with technology to the same extent that regular education students are. After all, she reasons, the curriculum for students in special education is the same as regular education students, but it is appropriately modified. The computers individualize instruction so well that they are an obvious tool for these students.

The special education administrator is not currently on a committee which deals with technology, but she would like to become involved in one. In fact, the special education administrator, the computer coordinator and the middle school principal met the week before the interview to discuss possible ways to increase access to computers by special education students. The special education administrator is particularly concerned with the dearth of activity at the middle school and is looking forward to effecting change there.

Regarding classroom instruction, the special education administrator readily admits that she is not sure how technology might be used today in the realm of special education in the district. She is interested, however, and is looking at how others are using technology. One technology-using program she is examining is the Gifted and

Talented program (which operates within the special education department) to determine if it can be modified to use in other areas of special education.

Regarding administrative uses of computers, the special education administrator has targeted the speech and language staff for training, both for administration and for use with students. The special education administrator feels that the speech teachers really need management tools similar to, but less involved than, the tracking program for general special education use. The special education administrator believes that these programs can be very valuable in decreasing the "mounds of paper" needed to manage programs.

The director of special services says that her predecessor was involved in technology in the district as evidenced by: the acquisition of the *Project Special* student tracking software; and the fact that there were 3 computers in the budget for this year for the Child Study Teams. (These were subsequently cut from the budget, but the director of special services will continue to try to get them). Her predecessor had also played a significant role in the acquisition of the computers currently in the special education classrooms.

### 2) The District Computer Coordinator

The district computer coordinator is an elementary school teacher who taught herself how to work with computers. Starting in 1982, for several years, the computer coordinator was one of eight teachers involved in a pilot study on the use of Logo in grades Kindergarten through six. The computer coordinator and another teacher shared a computer between their classrooms, but the other teacher never used it, so the computer coordinator had the computer virtually to herself. The students really liked Logo, which they used considerably.

The pilot was quite successful, and the district invested in a single lab for the four elementary schools. The computer coordinator, enthused about LOGO, talked to the superintendent and within a month, her job was changed. She became the lab teacher half-time and the coordinating teacher the other half (as the 'coordinating teacher,' the computer coordinator coordinated K-12 computer use). For the school years between 1985 and 1988, another lab teacher was hired full-time to travel with the lab, and the computer coordinator became the full-time computer coordinator. The computer coordinator went on maternity leave briefly and upon returning, came back three days a week as the computer coordinator.

### 3) The Lab Teachers

In earlier days, the lab teacher was assigned full-time to the lab and physically moved with it, spending half a semester in each elementary school. Later the two lab teachers spent half a year in each, the fall semester in one school and the spring in the other. When three of the four elementary school labs were installed, a small survey of their use was conducted. Forty percent of the teachers continued to use the lab and 60 percent ceased using them when the lab teacher departed. This year each of the four elementary schools has a permanent computer lab. In the survey, it was clear that teachers in the elementary schools wanted permanent, full-time computer teachers assigned to the labs. The district is splitting weeks instead, with lab teachers spending two days at School 1 and three days at School 2 one week, and three days at School 1 and two days at School 2, the other. If this doesn't work more smoothly, they will consider hiring two additional lab teachers.

Both of the lab teachers are former classroom teachers, and one is also a former special education teacher. The computer coordinator believes that it is the strong lab teachers who make the lab arrangement work. "They weren't just interested in computers. They were 'hot'...." One of the computer coordinators feels that the labs are important for encouraging synergy among students who sometimes work independently and sometimes in groups. Also, the lab setting gives those promoting technology use a degree of control and uniformity.

Regarding work done in the labs, sometimes classroom teachers generate ideas for what to do, and sometimes the lab teachers make suggestions. There is a good sense of collaboration between lab and classroom teachers. Currently, the lab teachers insist that classroom teachers accompany their classes to the labs. This involves the teachers and solves, in part, the problem of limited inservice time, since teachers then train alongside their students. There has been resistance on the part of some teachers, however, to being a learner in front of their students.

Teacher 1, who is a former special education teacher, admits that she has a bias in feeling that the students who need the computers most are special education students. She believes that the computer really alleviates the impact of a handicapping condition.

The computer coordinator confided to us that, "The computer teachers are great. They know the hardware, what is hot, and what is exciting for them and the students, and things are generally thriving."

## C. Committees

There are two committees operating with technology in District C: an advisory committee and a working committee. The advisory committee was established in 1984. (Although the Logo lab had started in 1982, the district did not really start planning until 1984.) The first advisory committee was composed of administrators and teachers. In 1986, another advisory committee, composed of representatives of industry, people from the State university, parents and administrators took a hard look at technology and decided they wanted to "buy in." That decision made a significant contribution to the district's current level of use. This advisory committee still operates at the highest level in the district.

A more functional, working committee is made up of one to three teachers from each school and the district computer coordinator. The principal helps the computer coordinator choose committee members, but the teachers also self-select. Any interested teacher can join this working committee. "They are instrumental" to the computer coordinator. The committee is primarily responsible for supporting the computer coordinator in planning and implementation related to technology, and in acting as a sounding board.

The committee is a well-used communications link with the rest of the staff in their schools. It is not the only link, though, between other staff and the computer coordinator. Because of the relatively small size of the district, the computer coordinator can talk directly with school administrators and has their permission to talk directly with teachers, as well. "Decisions are made without 50 people needing to give their input."

The computer coordinator reports to the assistant superintendent for curriculum directly. She meets with him briefly once every day or two, to fill him in on plans and progress. The assistant superintendent is not on the committee and does not use computers himself, but he supports the use of computers and the computer coordinator in her work. She also meets once a month with the superintendent. The computer coordinator feels that, when she has a good idea, the superintendent will act on it.

The budget for computer technology holds up well, generally, in the budget process. The computer coordinator has been counseled by the assistant superintendent to be realistic and ask only for as much as she can use effectively. She has been successful in getting what she asks for. The 96 computers in the elementary labs were funded by a community bond issue.

## D. Technology Planning

A broad philosophy for Kindergarten through twelve use of computers emerged from the district-level advisory committee: the computer should be used as a tool. There is a one-year plan which is to study use in the middle school, but no long-term (e.g., five-year)

plan. The computer coordinator readily admits she does not know how others can project five-year plans, due to the rapid rate and increasing complexity of technological change.

The computer coordinator accomplishes her planning by looking at the district's philosophy, its goals and its curriculum, not by scrutinizing the budget. If hardware recommendations come with the curriculum, they budget the hardware for the following year. She is supported in this approach by the superintendent who approves such allocations, believing as he does, that the curriculum should drive the process.

The computer coordinator's current informal plan includes the following: four computer lab teachers in the elementary schools, and two more labs (in addition to the current keyboarding lab), equipped with Macintosh computers, in the middle school. One of these labs is for related arts, which provides specific skills instruction, such as research and telecommunications, and the other serves as a resource for all teachers. The computer coordinator also wants to replace the current writing lab with Macintosh computers.

The computer coordinator has started an evaluation, in the form of a survey, of the elementary computer program. One finding was mentioned above: at the two schools that have a computer lab teacher only for the first half of the year, usage declined significantly during the second half of the year. Classroom teachers wanted lab teachers to stay. Eighty percent of the respondents wanted to use computers more. In other results, teachers believed the computer lab activities were appropriate for their students, and students thought the computers were worthwhile and made their work easier. "The biggest use of computers is with applications," carrying over lessons into the curriculum.

The computer coordinator believes that within ten years there will be more computers in the classrooms and that technology use will be more teacher-centered. Also, she would like to see mini-labs established, in addition to the single lab per school.

Until this year, Logo and basic skills were the main foci of the computer program. The Logo lab remained in existence, travelling from school to school until the end of the 1988-1989 school year. While the lab was in existence, special education students were integrated with regular education students at grade level for Logo instruction.

Although teachers felt that there were benefits to e gained from Logo, they were interested in making a direct connection between computers and their existing curricula. Thus, in the 1989-1990 school year the curriculum for computer use was to parallel that of the classroom. Their long-term goal is to integrate computers into the curriculum.

The district concentrates its computer efforts on several grades per year, due to limited resources. This year, grades four to six are the focus of computer use from among Kindergarten to sixth grades. The district has set a goal of 90 percent of fourth through sixth graders using computers in language arts, math and science next year. Ninety percent

was selected not because they wanted to exclude groups of students, but because they wanted to set a goal which they felt was realistic.

The current program of instruction for grades four to six includes the following:

| | |
|---|---|
| fourth grade | 20 lessons on word processing |
| fifth grade | 10 lessons on word processing; 10 on database |
| sixth grade | 10 lessons on word processing; 10 on database |

All of the activities in these lessons relate to ongoing activities in the classroom. Labs are often in use in the schools 100 percent of the time in a given week. Kindergarten to third grade classes schedule lab use in between grades four to six use.

Next year the middle school, specifically grades seven and eight, will be the focus of a curriculum review vis a vis computer use. In the past, the curricula have been perceived as set in stone. The computer coordinator believes that next year they will spend considerable energy to make real changes and bring them up to date.

## E. Hardware Selection, Acquisition and Access

The elementary and high school students in self-contained special education classrooms have computers in their rooms and access to the labs in the buildings. Mainstreamed students also have access to computer labs through their regular education classes.

Computer integration began, in large part, through the effort of individual special education teachers, who took the initiative to learn about and use computers with their classes. Special education was the first to use computers extensively. (In 1984, a teacher received a $200,000 grant for special education, Kindergarten through twelve. Unfortunately, no institutional memory of the purposes or uses of the grant exist today.) Special education now has 12 computers, 11 Apple IIs and one Macintosh.

The labs in the elementary schools are all the same. Each is equipped with 24 Apple IIgs computers and 12 Imagewriter II printers with switch boxes. The computers are not networked. Computers in elementary classrooms are entirely Apple II computers, most of them being the IIgs.

There is one computer in each of four self-contained special education classes in the middle school. The resource classroom, which has only a three-fifths time teacher, does not have a computer. At the middle school, self-contained students currently have no lab access. (One interviewer mentioned that the computer coordinator thought this lack of access was because self-contained middle school students participated in the Employment Orientation (EO) program. To this, the special education administrator replied, "If the EO program is the problem, then the EO program needs to be changed.")

In years past, unlike many districts in which technology is handed down the grade line, technology has been handed up to the middle school. It has inherited computers from the original elementary school travelling lab (Apple IIes with color monitors). Now, the middle school is getting two labs, trading in the IIes for IIgss and Macintosh computers.

In the high school, there are two Macintosh Plus computers in Art and 20 Apple IIes in math. There are two labs for the computer applications classes, both Apples. The business department has two IBM PS/2 Model 30 labs. Other Apple computers are distributed throughout the building in classrooms. There is also a mini-lab consisting of three Macintosh computers, a scanner and a laser printer for journalism students.

The district is buying 17 Macintosh computers in the 1989-1990 school year. The computer coordinator thinks the SE is a powerful tool. The Macintosh SE costs $1,237 through the arrangement they have at the district-level. The Apple IIgs computers each costs $200 more than the Macintosh computers. What the Macintosh does not have is a color monitor, but the computer coordinator has heard that Apple is in the process of developing one.

The plan is to have Macintosh computers only in grades seven to twelve, except for the IBM-based business labs. They are purchasing seven more IBMs for the business department to replace their typewriters. They will still be using IBMs for applications, math and business. The computer coordinator is finding they attract different students to different courses of study, depending on the hardware used. The students who are going immediately to the workplace are attracted to the business lab; those who will be continuing their education in college are more attracted to the Macintosh computers.

Of the incoming Macintosh computers, the high school's journalism and art classes will get three, and special education will get one. (They currently have one already.) Every elementary school lab will get one so that teachers become acquainted with using them. The principal and two secretaries will get Macintosh computers at two of the four elementary schools. They may be used only for teachers' paper work, or telecommunications, depending on the school. (The elementary schools will remain with the IIgs computers.) The computer coordinator will receive a Macintosh.

The district purchases via a consortium of school districts from across the State. It is a private organization, composed of computer coordinators, that aggregates orders to maximize purchasing power in dealing with suppliers. It is a grassroots organization and endorsed, but not sponsored, by the State. (A distinguished chair at a local highly respected university did an analysis of existing projects involving technology in education and cited the consortium as an excellent organization.) Because the consortium buys in bulk, the schools get 25 percent off the cost of hardware. They maintain a large inventory of consumable products (ribbons, paper, disks) and can fill orders quickly.

When the district has a large quantity of supplies to order, the computer coordinator issues a Request for Proposals (RFP) to several suppliers. The suppliers make bids for the business.

## F. Software Selection and Acquisition

In high school, computers are used primarily for word processing and business education. In the elementary schools, they are used mostly for reinforcement, especially in language arts and mathematics. Teachers in resource programs often use computers in their classrooms for skills reinforcement. The computers in the special education classrooms are used differently according to the needs of their students. Some are using them for word processing and desktop publishing, games, and basic skills drill and practice.

The software which the district purchased is generally stand-alone or in lab packs. They buy a single copy of software and review it first. Teachers can also go to the regional curriculum service program for software to preview. They try out programs and, if they like them, 20 copies are purchased.

The district has not bought a MECC membership. For a district this size the membership would cost $2,200, and they feel MECC's software does not offer them that much value. The district is a member of a consortium of school districts from across the State. Using this consortium membership, the district receives a 25 percent discount on the purchase price of software.

The computer coordinator does the software evaluations for software purchased in quantity. She controls the purchase of software and hardware via the purchase ordering system. Originally, they operated without a purchasing system. They had a bad experience when the math department bought inappropriate hardware, and the superintendent established the procedures to avoid further difficulties. The teachers may order software, but the purchase orders go through the computer coordinator. Even when teachers buy software with their own funds, they check with the coordinator first.

In the elementary school labs, they use several word processors including *CC Writer*, *Appleworks*, and *Children's Writing and Publishing Center*. The students really like Tom Snyder and Sunburst software. They think *USA GeoGraph* and *World GeoGraphic*, and *Math Problem Solving* are terrific programs. Sixth graders use *PrintShop* for making banners and similar things. The journalism teacher has *MicroSoft Works* and *PageMaker*.

## G. Provisions for Training and Technical Assistance

### 1) Training

There are many difficulties that keep the district from integrating computers into the curricula. To really do the job of integration, the computer coordinator feels, "We need super expertise and flexibility."

They have tried to alleviate the fear of computers by those teachers who are not enthusiastic about computers. They do inservice workshops, and encourage teachers to take the computers home with them during vacations and over the summer. They are conducting considerable Macintosh training. Their installing Apple dealer provides services and training. (IBM, she notes, works the same way.) They send their purchase orders to Apple directly and list who will be the installing dealer. Their dealer gives good support at no additional charge. In fact, their dealer offered 12-month warranties for the Apple computers which the district purchased, before Apple Computers itself did.

The computer coordinator keeps track of how many training sessions they are owed by the vendor and schedules them to train teachers in September. Teachers get release time for training.

Some training is done at the central administrative building, in the conference room. Considerable training is done off-site by their vendor. The purchasing consortium (see "Purchasing," below), also does training. Subsequent training may also be done in the Macintosh lab of a nearby school district.

The State also funds a regional curriculum service program that conducts free workshops on both IBM and Apple computers. District C has only to pay for substitute teachers needed to replace teachers sent for training. There are three of these centers in the State, and the computer coordinator thinks they are excellent. They have workshops on multimedia in the classroom, writing and computers and other topics that are very timely.

The special education administrator understands the importance of training and will not try to cut budgetary corners with it. The special education administrator says that she will sponsor training for special education teachers (related to technology or not) as she sees a need for it. She believes that training is necessary for change and that training must meet the needs of the audience. "It's not enough to say we have computers. Training is also essential." The special education director is aware that many districts have computers, but they are not necessarily in use. She wants the computers that the district already has to be available for special education students to use, which requires training and support.

Teachers have begun to refine their training needs because of some of the training that has already occurred. For instance, the elementary teachers want inservice workshops, but not if they are integrated with inservices for high school teachers. Training must be focused and appropriate, in order for it to have an effect.

### 2) Technical Assistance

Apple repairs are done in-house with computer parts ordered from the purchasing consortium. The district has 300 computers, so it has a $3,000 open Purchase Order to the purchasing consortium ($10 per computer) for repair parts.

A vocational education teacher at the high school also serves as the in-house maintenance and repair person. He receives $20 per hour for this work. During the school year, turnaround time on repairs is about a week. (It depends on the time of year, since the vocational education teacher also coaches several athletic teams.) However, the district maintains a few extra computers which can be used when a computer must be sent out for repair. If the vocational education teacher is not able to repair a broken computer, it may be sent to a small city nearby for repairs. They have found that to have repair persons visit the schools is too costly.

## H. Classroom Use of Computers

### 1) Special Project: IRIS/MECC

All four elementary schools are part of the IRIS/MECC telecommunications project. The former special education teacher, now computer lab teacher (Teacher 1), is the driving force behind the district's involvement in telecommunications. She received $1500 for online connect charges on IRIS for the 1989-1990 school year, and she is staying well within her budget.

This telecommunications project works in the following way. The lab teacher instructs students to give their word processing files a particular name and then collects the floppy disks they have used. The lab teacher actually goes online to send the files to the host computer. It is not the skill of electronic telecommunications that is emphasized in the projects, but it is the process of communicating.

There are a number of different conferences on IRIS' host computer, each focused on different topics and led by a professional teacher-moderator. Jeff and the Beanstalk, for instance, is a science project. A package of seeds and timelines were mailed to participants. Students are compiling data on variables such as longitude, rain accumulation, soil fertility, etc., and they will be analyzing them online.

Another project is Teleconnected Cultures. The computer coordinator believes that this telecommunications project provides valuable opportunities for cultural exchange and gives the students legitimate audiences for their writing. Other schools involved are in the Virgin Islands, Wisconsin and California. Discussions have focused on exploring foods, holidays and other celebrations, but the very different names of the students became a subject of real exchange among them. For this project, students are going to videotape themselves at school and send out the videos to the other schools where their penpals are. Teacher 1 requested permission to pilot-test the penpals project with special education students, too, and is now doing so.

### 2) Special Project: Young Authors Conference

Another special project is the Young Authors Conference. The conference is held on a Saturday, and adult authors come in to do workshops. Participation is voluntary, but all the elementary schools from this district participate. Each student publishes and brings a book as a 'ticket' to get in. Last year, 500 students attended. The conference provides an incentive for teachers to get students interested in producing a book on the computer.

Special education students often do their books on computer and attend the conference in great numbers. One special education teacher's entire class participated in the conference. This teacher knows *SuperFonts* and *AppleWorks*, and she assists the students in turning out beautiful work, both in the classroom and in the lab.

## I. Administrative Use of Computers

In the office of the special education administrator, there is an IBM microcomputer for the management of classification data. *Project Special* (a commercially available program) contains all tracking information, classifications, etc. for the special education students. The special education administrator believes it is a high quality and very valuable program. This software was here before this special education administrator came to the district, indicating that her predecessor was somehow involved in technology in the district. This notion is further evidenced by the inclusion of three computers in the budget for this year for the Child Study Teams. These computers were subsequently cut from the budget, but the special education administrator is trying to have them restored.

Although *Project Special* was here when the special education administrator arrived, it was not being used. Since the special education administrator's arrival, all office clerical staff have been trained on its use, and data for all students have been entered. When there was some resistance to using the program by the secretaries, she mandated its use, gave them a timeline for completing the task and held them accountable for its completion.

The special education administrator is not familiar with the *Project Special* software yet, but the system is up and running. She wants to become familiar enough with it so she can get the information she needs from the system without assistance. The special education administrator has had some computer experience, but she is not using a computer regularly at this point. She does not feel the need for a computer of her own in her office since there is one readily available to her in the outer office.

There are STARS terminals in each school building. STARS is a pupil management system that runs on the NCR mainframe. It handles attendance, payroll, scheduling and other administrative tasks. The secretaries like the mainframe and use it often. Next year, the registers will move to the mainframe, and the secretaries will access the mainframe to update it. One secretary, by the end of the summer, will trade her Apple IIgs for a Macintosh. The computer coordinator would like to see all the secretaries using Macintosh computers eventually, but for the near future, she sees more use of the mainframe, not less. The computer coordinator thinks the office computers will be used primarily for word processing and closely related applications.

Regarding school level administration, two of the four elementary school principals are avid users of computers, but the other two elementary principals, the middle school principal and the high school principal, are not. The new business administrator is an experienced Macintosh user and is getting a Macintosh IIci for himself. He is a big proponent of computers, and the computer coordinator believes he will influence other administrators to work more with computers. The computer coordinator expects he will be a valuable ally in increasing technology use in the district.

The special education administrator would like to see IEPs computerized as soon as possible, but she is not sure whether this program should be PC- or mainframe-based. One problem she sees with all IEP programs is that no matter how large the database of goals and objectives, it is never large enough—particularly for students with very severe and involved handicapping conditions. The special education administrator has noticed that those responsible for IEP development seem to write IEPs on the basis of what they know is available in the district and surrounding districts with whom District C works, and not always on the basis of what the child needs, as should be the case.

The special education administrator wants the IEP development process to be done with parental involvement as the law requires. It is the law that parents participate in the development process, but in many instances, the IEPs are prepared in advance of the meeting, and parents are given only token opportunity for input. Often, parents need time to digest the information they are given and the opportunity to adjust to new circumstances and expectations. "They are often devastated when they learn that their children won't grow up like other children."

The special education administrator believes that technology can facilitate the IEP development process. She would like to see IEPs developed on the computer, using it to

make changes while the parents are in the office, since they have to literally sign off on it. In addition to increasing parent participation, the special education administrator believes the use of technology will minimize complaints and disputes over IEPs in the long run.

# Chapter IV

# Results

# Chapter IV. Results

As mentioned in Chapter II of this report, the research team put forth 10 propositions relating to eight constructs in the following general areas: the special education administrator's experience with computer technology, the special education administrator's involvement in technology planning, the availability of hardware and software in the district, the availability of appropriate training and technical assistance, and actual use of computer technology by special education students.

Specifically, the eight constructs related to levels of:

- administrative use of computers by special education administrators,
- outside experience with computer technology by special education administrators,
- involvement of the special education administrator in district-level technology-related planning and decisionmaking,
- planning for computer use in special education programs;
- availability of computer hardware for special education programs,
- availability of computer software for special education programs,
- availability of training and technical assistance appropriate for the needs of special educators, and
- use of computer technology by special education students.

Upon further examination, the eight constructs were reduced to six to eliminate redundancy and improve readability. This was accomplished by combining the special education administrator's outside and on-the-job experience with computer technology and by combining hardware and software availability.

The following results are organized by construct and provide information about each of the three districts in which case studies were conducted. Two districts (Districts A and C) were considered "high use" and one (District B) was considered "low use" on the basis of our Phase I investigations.

## Construct 1: The level of the special education administrator's current administrative use or previous experience with computer technology

### District A:

In her previous role as principal at the district's center for severely and profoundly handicapped (SPH) children, technology was a major priority for the special education administrator. She also had gained experience with assistive devices in two previous positions, as principal of the center mentioned above and as assistant to her predecessor.

The special education administrator is a casual user of computer technology, primarily for word processing. She sought out and participated in some basic training in word processing, and feels comfortable using the technology for this purpose. Overall, she indicated that she feels comfortable with her current levels of computer understanding and skill, and is willing to rely on others with more expertise as needs arise. She believes that in her position, it is more important to understand the potential of a variety of technologies, than to have a lot of hands on experience.

**Summary:** The special education administrator has a considerable amount of exposure to and interest in computer technology.

### District B:

The special education administrator did not indicate that he had any hands on experience with computers or desire to increase either his knowledge about or skills in using computer technology.

**Summary:** The special education administrator has very little interest in or experience with computer technology.

### District C:

In a previous position, the special education administrator had experience planning a summer program in which special education students learned to use computers as a tool. She received training along with the students enrolled in the course. Also, in this previous position, she set up a program to train special education teachers to use computers. In another position, she was involved in a project to computerize special education records and reports. The special education

administrator also has hands-on experience with the technology. She has a computer at home, and has used it for correspondence and reports, maintaining a database of audiovisual materials, and managing her personal budget.

Based on her experience with the technology, she has strong belief that computers are an indispensable tool for special educators in instruction and administration of programs. In the short time she has been in her current position, she has had her staff trained in the use of special education student tracking software, which had been purchased prior to her arrival, but was not in use.

**Summary:** The special education administrator has a good deal of exposure to and interest in computer technology.

## Construct 2: The level of the Special Education Administrator's involvement in technology-related district planning and decisionmaking

### District A:

The special education administrator reported that at times she felt she was not aware of what was occurring in regular education because of the demands of her job. In fact, she reported feeling less involved in technology planning than when she was principal of the SPH center. However, she has assigned a representative from her staff to serve on the district computer technology planning committee. This individual is very involved in district-wide and special education planning for technology, and reports regularly to her.

**Summary:** The special education administrator is not actively involved in district-level technology planning. However, she has assigned a key member of her staff to serve in her stead and represent special education interests.

### District B:

The special education administrator has not been and is not now actively involved in district-level decisionmaking about technology. In a current major effort to expand the use of technology, he plays no active role. He has told the new district computer coordinator to do what she can in the expansion effort.

The special education administrator in this district is no longer responsible for the supervision of special education instruction. He is primarily responsible for ensuring appropriate placements for students and compliance with all legal requirements related to special education.

Supervision of special education instruction has been transferred to the director of instruction, who is now responsible for instruction in regular and special education for all grades, kindergarten through twelfth. Both the director of instruction and the district computer coordinator believe that, for the most part, special education planning for technology use should take place within the framework of regular education planning. This set of circumstances leaves the special education administrator in the position of having very little influence over what happens in special education classrooms.

**Summary:** The special education administrator is not involved in district-level planning for the use of computer technology.

### District C:

The special education administrator is new to the district this year. At the time of the site visit for this study, she had been in the district for less than 6 months. However, she reported that her predecessor was involved in technology planning in the district, and had worked to acquire computers and software for special education administration and instruction.

She also made it clear that she views herself as an advocate for special education students, supports the mainstreaming of these students, and believes that, once she has become more familiar with the district, she will become more involved in general district planning for technology use. Currently, there is a district-level planning committee in the district, and she believes that in the near future she may join this committee.

**Summary:** The special education administrator is not actively involved in district-level technology planning as yet. Her predecessor was actively involved. She believes that, in the near future, she will become active in technology planning to ensure continued representation of special education interests.

## Construct 3: Level of planning for computer use within the special education program

### District A:

During the year in which the study was conducted, the special education administrator and key staff were involved in long-range planning for special education. From this, technology increased and improvement emerged as a major priority. In response, the administrator and key staff

formulated a set of long-range goals (e.g., support for placement of technology in classrooms rather than labs, goal of at least one computer in every special education classroom). This was the first formal planning for technology within the special education program.

However, planning for technology use in special education has occurred informally for a number of years. This informal planning led to the creation of a teacher liaison position to support teachers and participate in district planning. It also led to the creation of a district augmentative communications team to ensure that more severely handicapped children have access to appropriate technology.

**Summary:** Planning within the special education program has been ongoing for a number of years. It is generally informal and in response to an identified need. However, recently, there has been interest in formalizing plans and developing long range goals.

**District B:**

In this district, there has been no special education specific planning for technology use. The special education administrator has been willing to allow teachers to pursue their own goals for technology use independently, but has provided no tangible support for their efforts. He gave no indication that he would take a more active role in the future. Given that all planning for special education instruction now occurs under the umbrella of planning for regular education instruction, it seems unlikely that involvement by the special education administrator will increase.

**Summary:** There is no indication of any systematic planning for technology use within the special education program.

**District C:**

In previous positions, the special education administrator was involved in technology planning for special education. Since coming to this district, she has met with the computer coordinator and at least one building principal to find ways to increase the access of special education students to computers. She indicated that she is now involved in planning to increase the use of technology in the speech/language program. She is also interested in using computers to facilitate the IEP development process. All of this has occurred informally, since there is no formal committee for technology planning within the special education program.

Summary: Although the special education administrator is quite new in the district, she has begun to plan for additional uses of computers in the special education program. Her predecessor was involved in planning for computer use within special education.

## Construct 4: Level of availability of material resources for use by special education teachers and students

### District A:

This district's first use of technology was in special education in its special centers. Interest spread from special to regular education. The district has now made a commitment not to do any piecemeal planning, and so special education is now included in all district planning. It is anticipated that much of the access to computers in the future will be through resources purchased for all students, rather than those purchased only for special education students.

A member of the special education administrator's key staff who serves on the district technology planning committee works very well with the district computer coordinator. Both the special education administrator and her representative regard him as an ally, and believe that special education teachers and students are getting their "fair share" of material resources.

The district is very committed to providing computer access to all students. Although many special education classrooms have one computer, few have more than that. Current plans are to provide at least one computer in each special education classroom.

Mainstreamed special education students generally use computers with their mainstream classes, as most schools have computer labs for whole class use. Thus, they have access to the same equipment that regular education students use. Students in self-contained classrooms in some cases only have access to older equipment which has been assigned to special education. In some classrooms, this equipment goes largely unused because of the limited amount of appropriate software available.

Summary: Both the special education administrator and her liaison would like more and better computers for special education students. However, they believe that the material resources available to special education students are generally equivalent or identical to those available for regular education students.

**District B:**

Computer equipment and software availability is now increasing rapidly. There is more currently available at the elementary level than in the middle and high schools. The district's goal is to have one computer in every classroom within 2 years. At the time of the visit, about 55 percent of classrooms had a computer.

A number of teachers in the district, including special education teachers, have obtained equipment and software for their classrooms through grants. However, these were isolated instances, and the overall level of technology access was very low prior to the recent initiative to increase the use of technology system wide.

**Summary:** Equipment availability in this district for both special and regular education has been at a very low level, but is now rapidly increasing. In general, due to merging planning for regular and special education instruction, it seems likely that the equipment purchased for regular education will also be available to special educators and their students.

**District C:**

Elementary and high school students in self-contained special education classrooms have computers in their classrooms and access to the labs in their buildings. Mainstreamed students also have access to computer labs through their regular education classes. Each elementary school has a full class computer lab. At the middle school, self-contained students currently have no access to a computer lab. Although there is one computer in each of the self-contained classrooms in the middle school, the special education administrator believes that the access of special education students at the middle school level is less than adequate.

Hardware continues to be purchased in sizable quantities. All students in the district use software for both skills reinforcement and as a productivity tool. Special education students use software similar or identical to software used by nondisabled students.

**Summary:** At the elementary level, students appear to have good access to computers and a range of software. Availability of equipment and software to special education students is less adequate at the high school, and is considered inadequate by the special education administrator at the middle school.

## Construct 5: Level of availability of appropriate training and technical assistance for special education teachers

### District A:

Some district-sponsored training in technology use is currently available. Some resources are also available to support staff participation in outside training. There is no formal system or established path for technology training. Teachers set their own goals and determine their own training needs. Informal training and technical assistance is provided by the special education administrator's liaison for technology planning and by itinerant professionals on her staff.

The district's computer repair system is considered very satisfactory and responsive to teachers' needs. The repair technician has modified equipment for special education students.

Special educators also receive assistance, particularly in augmentative communications, from the state department of education. A district speech therapist who is a member of the district's augmentative communications team, serves as liaison to the state organization.

**Summary:** The availability of technical assistance, both with regard to hardware maintenance and teacher support, was judged very adequate by all respondents. There is little formal training within the district designed specifically for special educators. However, resources are available to allow interested teachers to attend outside training.

### District B:

Training for technology use has been minimal in the past. However, the new district computer coordinator believes strongly that training and technical assistance are critical. Thus, it is an integral part of their current effort to increase the use of technology. She is planning training sessions and working to develop a network of individuals capable of providing on site training and technical assistance. This network includes at least one special education teacher.

**Summary:** There has been very little training related to technology in the past. However, the district intends to provide training and technical assistance to support the current technology initiative.

### District C:

Each of the district's four elementary schools has a computer lab which is staffed half-time with a computer lab teacher. One of the two lab teachers is a former special education teacher. Each

lab teacher is responsible for the management of the labs in assigned schools, for providing instruction to students in the lab for specified curriculum units, and for providing teacher training. This training occurs informally, as teachers work with their students.

The district also provides in-service workshops to improve teachers' computer skills. Much of this training is provided by outside organizations such as their hardware vendor or a regional curriculum service center.

Their hardware vendor provides some ongoing technical assistance, particularly hardware repairs. A teacher within the system also does some minor hardware repairs. The district computer coordinator and the two computer lab teachers provide other kinds of technical assistance on an ongoing basis.

The special education administrator believes that appropriate training is absolutely necessary if change is to occur. She has targeted the speech and language staff for training, both in administrative uses of computers and in use with their students.

**Summary:** Substantial efforts are being made to provide appropriate training and technical assistance. The presence of a former special education teacher as one of the computer lab teachers helps ensure that some needs of special educators are met. Formal training for some special education staff is in the planning stages.

## Construct 6: Level of computer use by special education students in the district

District A and District C were identified as relatively high computer-using districts on the basis of Phase I investigations. District B was identified as a relatively low computer-using district.

All districts were selected from the Phase I sample of 100 districts. High use districts had relatively high levels of hardware and software availability, training and technical assistance availability, and student use of computers.

Please note, the word *relatively* is used advisedly. Although both District A and District C have a considerable amount of equipment, available training and technical assistance, and are actively planning to increase the use of technology in special education programs, staff in both districts believed there was much more they could do. Likewise, while District B is still experiencing a low level of technology use by special education students, the new technology initiative explicitly includes special education, and significant growth in use is expected.

# Chapter V

# Conclusions and Discussion

# Chapter V. Conclusions and Discussion

## I. Conclusions

Based on the accumulated evidence, a judgement was made as to whether the evidence clearly supports the proposition, lends qualified support to the proposition, or does not support the proposition. Evidence on each construct, as encapsulated in the summary statements above, is presented in this section, along with statements about support of the proposition.

Below we present the propositions and summary statements for each construct for **District A.**

- An increase in the special education administrator's use of computers for administrative tasks or a higher level of experience with computers outside the current job of special education administrator (for either personal use or in previous positions such as special education teacher) results in increased involvement in district-level technology planning activities.

  - The special education administrator has a considerable amount of exposure to and interest in computer technology.

  - The special education administrator is not actively involved in district-level technology planning. However, she has assigned a key member of her staff to serve in her stead and represent special education interests.

  - *The evidence supports this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased numbers of computers and computer-related equipment (e.g., printers, adaptive peripherals) or in increased numbers of software packages in special education programs.

  - The special education administrator is not actively involved in district-level technology planning. However, she has assigned a key member of her staff to serve in her stead and represent special education interests.

  - Both the special education administrator and her liaison would like more and better computers for special education students. However, they believe that the material resources available to special education students are generally equivalent or identical to those available for regular education students.

  - *The evidence supports this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased planning of instructional computer use in special education programs.

  - The special education administrator is not actively involved in district-level technology planning. However, she has assigned a key member of her staff to serve in her stead and represent special education interests.

  - Planning within the special education program has been ongoing for a number of years. It is generally informal and in response to an identified need. However, recently, there has been interest in formalizing plans and developing long range goals.

  - *The evidence supports to this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased availability of technical assistance and appropriate training for special education teaching staff.

  - The special education administrator is not actively involved in district-level technology planning. However, she has assigned a key member of her staff to serve in her stead and represent special education interests.

  - The availability of technical assistance, both with regard to hardware maintenance and teacher support, was judged very adequate by all respondents. There is little formal training within the district designed specifically for special educators. However, resources are available to allow interested teachers to attend outside training.

  - *The evidence lends qualified support to this proposition.*

- An increase in numbers of computers and computer-related equipment (e.g., adaptive peripherals) or numbers of software packages available for use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

  - Both the special education administrator and her liaison would like more and better computers for special education students. However, they believe that the material resources available to special education students are generally equivalent or identical to those available for regular education students.

- Levels of computer use by special education students in District A are relatively high.
- *The evidence supports this proposition.*

- An increase in planning of instructional computer use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).
  - Planning within the special education program has been ongoing for a number of years. It is generally informal and in response to an identified need. However, recently, there has been interest in formalizing plans and developing long range goals.
  - Levels of computer use by special education students in District A are relatively high.
  - *The evidence lends qualified support to this proposition.*

- An increase in availability of technical assistance and appropriate training for special education teaching staff results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).
  - The availability of technical assistance, both with regard to hardware maintenance and teacher support, was judged very adequate by all respondents. There is little formal training within the district designed specifically for special educators. However, resources are available to allow interested teachers to attend outside training.
  - Levels of computer use by special education students in District A are relatively high.
  - *The evidence lends qualified support to this proposition.*

Below we present the propositions and summary statements for each construct for **District B.**

- An increase in the special education administrator's use of computers for administrative tasks or a higher level of experience with computers outside the current job of special education administrator (for either personal use or in previous positions such as special education teacher) results in increased involvement in district-level technology planning activities.
  - The special education administrator has very little interest in or experience with computer technology.

- The special education administrator is not involved in district-level planning for the use of computer technology.

- *The evidence supports this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased numbers of computers and computer-related equipment (e.g., printers, adaptive peripherals) or in increased numbers of software packages in special education programs.

  - The special education administrator is not involved in district-level planning for the use of computer technology.

  - Equipment availability in this district for both special and regular education has been at a very low level, but is now rapidly increasing. In general, due to merging planning for regular and special education instruction, it seems likely that the equipment purchased for regular education will also be available to special educators and their students.

  - *The evidence lends qualified support to this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased planning of instructional computer use in special education programs.

  - The special education administrator is not involved in district-level planning for the use of computer technology.

  - There is no indication of any systematic planning for technology use within the special education program.

  - *The evidence supports this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased availability of technical assistance and appropriate training for special education teaching staff.

  - The special education administrator is not involved in district-level planning for the use of computer technology.

- There has been very little training related to technology in the past. However, the district intends to provide training and technical assistance to support the current technology initiative.

- *The evidence lends qualified support to this proposition.*

- An increase in numbers of computers and computer-related equipment (e.g., adaptive peripherals) or numbers of software packages available for use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

  - Equipment availability in this district for both special and regular education has been at a very low level, but is now rapidly increasing. In general, due to merging planning for regular and special education instruction, it seems likely that the equipment purchased for regular education will also be available to special educators and their students.

  - Levels of computer use by special education students in District B are relatively low.

  - *The evidence lends qualified support to this proposition.*

- An increase in planning of instructional computer use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

  - There is no indication of any systematic planning for technology use within the special education program.

  - Levels of computer use by special education students in District B are relatively low.

  - *The evidence supports this proposition.*

- An increase in availability of technical assistance and appropriate training for special education teaching staff results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

  - There has been very little training related to technology in the past. However, the district intends to provide training and technical assistance to support the current technology initiative.

- Levels of computer use by special education students in District B are relatively low.

- *The evidence supports this proposition.*

Below we present the propositions and summary statements for each construct for **District C**.

- An increase in the special education administrator's use of computers for administrative tasks or a higher level of experience with computers outside the current job of special education administrator (for either personal use or in previous positions such as special education teacher) results in increased involvement in district-level technology planning activities.

  - The special education administrator has had a considerable amount of exposure to and interest in computer technology.

  - The special education administrator is not actively involved in district-level technology planning as yet. Her predecessor was actively involved. She believes that, in the near future, she will become active in technology planning to ensure continued representation of special education interests.

  - *The evidence lends qualified support to this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased numbers of computers and computer-related equipment (e.g., printers, adaptive peripherals) or in increased numbers of software packages in special education programs.

  - The special education administrator is not actively involved in district-level technology planning as yet. Her predecessor was actively involved. She believes that, in the near future, she will become active in technology planning to ensure continued representation of special education interests.

  - At the elementary school level students appear to have relatively good access to computers and a range of software. Availability of equipment and software to special education students is less adequate at the high school and considered inadequate by the special education administrator at the middle school.

  - *The evidence lends qualified support to this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased planning of instructional computer use in special education programs.

  - The special education administrator is not actively involved in district-level technology planning as yet. Her predecessor was actively involved. She believes that, in the near future, she will become active in technology planning to ensure continued representation of special education interests.

  - Although the special education administrator is quite new in the district, she has begun to plan for additional uses of computers in the special education program. Her predecessor was involved in planning for computer use within special education.

  - *The evidence lends qualified support to this proposition.*

- An increase in the special education administrator's involvement in district-level technology decisionmaking results in increased availability of technical assistance and appropriate training for special education teaching staff.

  - The special education administrator is not actively involved in district-level technology planning as yet. Her predecessor was actively involved. She believes that, in the near future, she will become active in technology planning to ensure continued representation of special education interests.

  - Substantial efforts are being made to provide appropriate training and technical assistance. The presence of a former special education teacher as one of the computer lab teachers helps ensure that some needs of special educators are met. Formal training for some special education staff is in the planning stages.

  - *The evidence lends qualified support to this proposition.*

- An increase in numbers of computers and computer-related equipment (e.g., adaptive peripherals) or numbers of software packages available for use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).

  - At the elementary school level students appear to have relatively good access to computers and a range of software. Availability of equipment and software to special education students is less adequate at the high school and considered inadequate by the special education administrator at the middle school.

- Levels of computer use by special education students in District C are relatively high.
- *The evidence lends qualified support to this proposition.*

- An increase in planning of instructional computer use in special education programs results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).
  - Although the special education administrator is quite new in the district, she has begun to plan for additional uses of computers in the special education program: Her predecessor was involved in planning for computer use within special education.
  - Levels of computer use by special education students in District C are relatively high.
  - *The evidence supports this proposition.*

- An increase in availability of technical assistance and appropriate training for special education teaching staff results in increased use of computer technology by special education students (in mainstream and special education course work or in support in their instructional programs).
  - Substantial efforts are being made to provide appropriate training and technical assistance. The presence of a former special education teacher as one of the computer lab teachers helps ensure that some needs of special educators are met. Formal training for some special education staff is in the planning stages.
  - Levels of computer use by special education students in District C are relatively high.
  - *The evidence supports this proposition.*

## Summary

Overall, the evidence tends to support the propositions established at the outset of this study. All propositions are supported or conditionally supported by the evidence. In both Districts A and C, the special education administrators are somewhat knowledgeable about and recognize the potential of technology for special education students. They have been active in district technology-related planning or have delegated a close colleague to serve as their representative and keep them informed. They have made efforts to do some planning within the special education department to ensure that the needs of special education students and teachers are met. Special education teachers are supported in their efforts by some formal training and with readily available, high quality technical assistance,

often from special educators. In these districts special education students have access to hardware and software which is at least on a par with that employed by regular education students. Finally, many special education students in these two districts are using the technology frequently and in ways that are appropriate for their educational needs.

On the other hand, in the low use district, the special education administrator is not involved in moving technology development in the district forward. He does not have a good understanding of its potential and has not participated in any planning to increase its use, either district wide or within the special education department. Special education students in this district currently have little access to or experience with computer technology.

## II. Discussion

The results from Phase II are consistent with those from the Phase I studies, which revealed a significant positive correlation between special education administrators' involvement in technology planning and the availability of hardware and software for use by special education students. The Phase I study also indicated a significant positive correlation between special education administrators' involvement in technology planning and actual level of computer use by special education students. However, it is recognized that this Phase II study has limitations.

First, Phase II involved only three sites. No claim is made that a similar pattern will be found in all, or even most, school systems. Second, even if evidence from all three sites had supported all propositions without qualification, it would be improper to claim that the propositions are correct as stated. The propositions are stated in terms of simple causal relationships. However, we recognize that it is unlikely that the relationships between the constructs are simple or direct, as schools and school systems are complex organizations with many uncontrollable contextual variables. The remainder of this discussion section will focus on two important variables and on several themes which emerged during the analysis of the case studies.

One very important variable is undoubtedly the level of technology planning and implementation in the district as a whole. It seems clear that the overall level of activity affects, to some extent, the likelihood that the special education administrator will be involved. Where individuals in many roles are working together to integrate technology into instructional programs, it is likely that the special education administrator will be among them. Another important variable affecting the likelihood of the special education administrator's being involved in technology planning is the way in which the role of special education administrator is defined in the district. In a district where the special educatior administrator is primarily responsible for placement and compliance, it seems far less likely that the administrator will be actively involved in technology planning.

However, it is also clear that the position of special education administrator allows considerable latitude to establish individual priorities for the special education program. Personal knowledge

and beliefs regarding the usefulness of technology appear to dictate to some extent whether the administrator makes increasing access to and use of technology a priority.

When it is established as a priority, the special education administrators studied tended to see their responsibility as assisting in making decisions and facilitating implementation. The administrators in this study did not see the need to have extensive hands-on experience with the technology. They believed that they needed knowledge of the capabilities of the technology and its potential application in special education.

This seems to be an appropriate stance, given that the primary responsibility for technology planning and implementation resides elsewhere. In all districts, the district computer coordinator had primary responsibility for actual implementation; most planning was handled by the district computer coordinator in conjunction with senior district staff.

The administrators in this study saw their primary means of accomplishing their technology goals as very dependent on relationships with others in the district who were involved in technology planning and implementation. None of the administrators was actively involved personally in committee processes related to technology. However, the administrators in the two high using districts communicated informally and worked cooperatively with those individuals who were very involved in the planning and implementation of new technologies.

Overall, in all three districts, it was expected that planning for technology in special education would, to a great extent, be included in planning for regular education. The exception to this was in the area of special adaptive and assistive technologies for severely handicapped children. This kind of planning, which requires careful matching of technology with an individual student, was considered to require special skills and considerable time. It was felt that this was best left to an individual in the district or in a regional consortium with this special expertise.

The two special education administrators in the two high using districts recognized that training for staff was very important. They believed that much of this training could be provided by regular educators in the district, since many of the needs of special and regular educators are similar. However, they were aware that some types of training, particular for use of technology with students with low incidence handicaps, would most likely be provided through other means. Conference attendance, attendance at special workshops, and one-on-one training with a special education technology support person were among the alternatives considered or employed.

All of the administrators expressed concern about ensuring access for special education students to appropriate material resources, both equipment and software. At the time of the site visits, in all three districts, computers used by special education students included some acquired with special education funds or through special grants and some acquired with regular education funds. There was still some tendency for special education to be using the older equipment in each district. However, in general, the administrators believed that access for special education students was at approximately the same level as for regular education students.

However, one problem noted was the difficulty that special education has getting rid of older equipment which has very limited usefulness. The presence of this older equipment gives the impression that special education students have good access, although the equipment may go unused due to limited availability of appropriate software. This impedes efforts to get newer more appropriate equipment in locations accessible to special education students.

Despite such problems, in both high using districts, the special education administrators viewed their efforts as successful overall. However, there was also a recognition that, no matter how well they plan, everything will not always work out exactly as anticipated. This feeling that it was acceptable to fail in the short run, but ultimately succeed in reaching long term goals, seemed to allow special education teachers working in these districts to plunge ahead. In both high using districts, the range of uses of the technology was gradually expanding, and many special educators in these districts were enthusiastic about the potential of the technology in programs for students with disabilities.

On the basis of the case studies, with support from the Phase I investigations, it appears that special education administrators exhibit a range of involvement, from highly involved to very disinterested. This appears to be partially determined by previous experiences and personal preferences, and partially determined by the context in which they are operating. In all three districts, there seemed to be a willingness to rely on the much greater resources of regular education to the fullest extent possible. In the two high using districts, the administrator believed that it was important to communicate with regular educators involved in planning and implementation to ensure that the technology-related needs of special education students and teachers were met. This communication was often informal and relied on long term relationship, rather than formal participation in committee processes.

Both Phase I and Phase II studies indicate that, where special education administrators are interested and involved, special education students have access to and use of computer technology. Special education administrators can play a significant role in ensuring that district technology planning includes special education, and that material resources and human resources appropriate for the needs of special educators are available. In the following chapter, we present a set of guidelines that special education administrators may find useful as they work to integrate technology into special education programs.

## III. Dissemination

The guidelines mentioned above will be posted on SpecialNET. In addition, this report, along with the Phase I final report, will be submitted to ERIC. The SpecialNET notice will include an announcement that the document will be available through ERIC in the near future.

Initial findings from this project were disseminated at the 12th Educational Computing Organization of Ontario and the Eighth International Conference on Technology and Education, "Emerging Partnerships," in Toronto, Canada. The conference, emphasizing the critical links

between technology, education and society, ran from May 3 to May 10, 1991, and was cosponsored by Microsoft Corporation, Tandy Corporation/Radio Shack Education Division, T.H.E. Journal, and the U.S. Department of Defense Dependent Schools among others.

Among those sessions exploring technology integration in special education was a presentation by Elaine Robey entitled, "Processes and practices of special education administration that encourage effective implementation of technology." Ms. Robey's paper was also published in the conference proceedings.

# Chapter VI

# Guidelines

# Chapter VI. Guidelines

## I. Planning for Special Education Technology

The guidelines presented here are based on the case studies conducted for this project, on results from a related OSEP-funded project to develop a model of technology integration for special education programs, and on literature on the topic of administrative involvement in technology planning and implementation. These guidelines are intended as a quick-start tool for busy special education administrators. It is hoped that they will prove useful as these administrators work to integrate computer technology into the special education programs of their districts.

### A. Define and Communicate your Interest in Technology

Communication is the key. You have already set priorities in your role of special education administrator. Regarding a technology initiative, you must communicate that interest to others at the central office level and throughout the district. With the current emphasis on technology, it is likely that there already have been discussions about the integration of technology into the educational programs of the district. Someone in the district may already be charged with guiding the technology effort in regular education or for administrative purposes. You need to know about all technology initiatives that are happening in your district. Many approaches and techniques focused in other areas can be applied within special education, and your district can avoid unnecessary duplication of effort.

### B. Identify a Model for Technology Integration

The federal government has funded several very usable models over the past several years. Administrative membership associations also have focused on issues and implementation guides for technology integration in schools. Becoming familiar with various aspects of technology integration will assist you in noting different functions and roles that are needed to keep the entire technology initiative moving forward.

### C. Get your Office Involved

Set a good example; let others see that technology is being used in your daily office work. If technology is not your forte, relax. Someone in your office is likely to be informed about technology and would relish the opportunity to put their knowledge to work. The potential impact technology can have is too important to leave to chance. Provide the designated staff person with sufficient time to become truly involved in the whole of the district's technology effort, not just as it pertains to special education. The greater the

contribution made by a representative from your office, the greater the influence your office can have on technology planning and implementation throughout the district.

## D. Identify an Individual to Take Charge

For more involved special education needs, a single key person at the district-level who has a basic level of knowledge regarding special education needs should be given the responsibility of identifying uses of technology for students with special education needs and advocating promising technology practices in special education. Paired with that responsibility must be adequate resources, in time and money, for addressing identified needs. As with any other facet of special education, the special education technology resource person must have the freedom to assess, test, and modify technological solutions that have been identified.

## E. Concentrate your Energies

The special education administrator's office may choose to concentrate its efforts much like the district computer coordinator's office often does, choosing, for instance, to concentrate solely on technology that addresses speech and language difficulties one year and focusing on remediating perceptual deficits the next.

## F. Aligning Technology Applications with Your Curriculum

Most schools identify a few grades or subjects for curriculum review for each year. Curriculum reviews can also be used as an opportunity for integrating technology into instruction. In this way, the district computer coordinator can support the committees readily.

## G. Be Open to Experimentation

Create an atmosphere that reflects the adage "better to have tried and failed than never to have tried at all." When teachers are enthused enough to generate ideas for using technology with their students, they must be allowed to test them. And remember to mull over experiments that fail for the lessons they contain.

## H. Pilot Test Good Ideas

Put resources into pilot testing those ideas that appear to be the most valuable, and let your native intelligence and intuition guide your decisions. Many valid decisions are made based on hunches, but grounded in experience and common sense.

## I. Tap Into an Enormous Network of Knowledge

The individual identified by your office to focus on technology can seek out conferences, publications, and electronic communications on the topic of technological solutions to meet special needs. Both the special education administrator and the technology representative can discuss with peers what their districts are doing. They can then communicate those findings to classroom teachers. It also is possible to "introduce" other administrators and teachers across districts by establishing communication links through electronic bulletin boards or conferences. Also, many teachers are studying technology in college and other types of programs. Take advantage of their updated knowledge by arranging for them to train others on technology use.

## J. Take Advantage of Available Resources

Investigate the numerous federal and state funded resource centers that were created to support school districts in technology use. They are staffed with knowledgeable individuals who visit many schools over a year's time and are familiar with a wide range of practices. These individuals take pleasure in sharing what they have learned and moving practices into the classroom or the lab. Scout out these centers, and use them.

## K. Use Technology Yourself

Be an example. Designate an office task for completion via computer. Visit classrooms and labs, and see how computers are being used. Increase both your awareness and understanding of technology uses through discussions about what you see at conferences and what you read.

## L. Spend Training Dollars Liberally

All the money in the world spent on technology is useless without the training to operate it. Many teachers remain wary of technology, even after they have had some experience. After a training session or two, they need to practice in order to be truly comfortable with technology before they can reap any benefits it may offer. How teachers feel about

technology is critically important in determining how they use it. Make sure their feelings are positive.

## M. Use Technology to Renew Teachers' Enthusiasm for Teaching

Teachers who have been in the classroom for years often become isolated. Many of those same teachers are reporting that technology has saved them from burning out. This renewal of energies is sure to benefit the students they serve.

## N. Address Multiple Training Needs

There are two kinds of training that must occur to integrate technology into the curriculum. One is the "Computers 101" training about the technology itself—finding the on/off switch, learning the parts of the computer and how to handle diskettes, and loading programs. Many teachers now have this basic information. The second is actually using computers with students. Using technology in front of a classroom of students is an entirely different experience. Coupled with the latest teaching strategies and methodology, using computers with a class may become an unfamiliar event. Teachers often feel as though they have entered a realm of teaching entirely unknown to them. Training on how to use computers in the classroom must build on what teachers already know, address the use of technology with groups of students, and provide adaptations to meet individual teaching styles.

## O. Ensure that the Training Needs of Special Education Teachers are Met

Many uses of technology are as beneficial to regular education as to special education. Leverage your time by letting regular education focus on providing training in areas of common interest. You can focus your attention where special training is required. For instance, hardware such as voice synthesizers, speechboards, and keyboard overlays, and software such as that used for speech training.

## P. Recognize the Importance of Flexibility in Training

Much training that is really successful occurs in one-on-one experiences during class time and after school, when one teacher is looking over the shoulder of another, exploring a piece of software or using a program or application. These very meaningful interactions around technology should be fostered wherever they occur.

## Q. Maximize the Outcomes of Inservice Training Sessions

Communicate with teachers directly about their needs. Soliciting their input while they are assembled allows you to avoid increasing the amount of paper they must deal with. Encourage the development of peer networks. Have teachers introduce themselves, mention their current level of technology use, and share any special projects they are doing that other teachers might find applicable.

## R. Be Inclusive

Include teachers at all levels of familiarity with computers. For example, first time teachers, who have had some technology instruction in their preservice programs, may have more advanced training needs than experienced teachers with limited technology experience. Along the same lines, ensure that teachers are aware of variety of applications of the technology.

## S. Follow up After Training Exercises

Follow through for training sessions that do not include hands-on experiences. As shortly after the training as possible, provide ready access to the appropriate technology so teachers can test the content of the training they received. Until they actually work with a computer regularly, many teachers will experience anxiety. This can be reduced, often quickly, through successful, supported experiences with technology.

## T. Assign Responsibility to an Individual on Site

Ensure that there is someone at every site who is comfortable with technology and can perform basic level troubleshooting. If the district computer coordinator is not also the technical support source, or the district has not appointed a person to deal specifically with technical assistance, try to find a member of your staff who will volunteer to take the lead on technical assistance. There is sufficient enthusiasm in the schools that finding a leader should not be difficult. Work within your district's policy and procedures to provide this person with support such as additional class-free time or the assistance of an aide.

## U. Establish a Policy for Replacing Old Hardware

Set rules on what types of hardware can be realistically supported. Many parent-teacher groups want to provide equipment for the schools. If they are purchasing equipment, let them know what fits in the district's plans. If they are obtaining equipment through a promotion by local retail stores, and that equipment is not compatible with your district's

plan, trade, sell, or raffle the equipment to get what you need. Keep all of your dealings public and provide information to the community about your plans. If you receive technology through grant programs and foundations, make arrangements to return the equipment to the lending organization when it has passed its usefulness. Hardware that no longer supports quality software can cause many frustrations.

# Appendix A

## Phase I Survey Questions

**Questions For Special Education Director (Survey 1)**

**National Center For Educational Statistics (NCES) Information**

1 Record Number (1 - 17068)
1.1 _____

2 State Code (1 - 60)
2.1 _____

3 Agency Number (1 - 99999)
3.1 _____

4 Name Of Education Agency (30 characters)
4.1 _____

5 Agency Type Code (1 - 2)
5.1 _____

6 Student Counts Total (0 - 999999)
6.1 _____

7 Student Counts Special Ed IEP (0 - 999999)
7.1 _____

8 Additional Information - Location By Region (1 - 4)
8.1 _____

**Survey Information**

9 Form Number (1=Spec Ed Dir, 2=Computer Coord 3=Spec Ed Teach)
9.1 _____

**Special Education Director Information**

10 Salutation (Mr., Ms., Mrs., Miss, Dr.)
10.1 _____

11 First Name
11.1 _____

12 Middle Initial
12.1 _____

13 Last Name
13.1 _____

14 Business Phone Number
14.1 _____

15 Date Of Interview
15.1 _____

16 Time Of Interview
16.1 _____

**Questions For Special Education Director (Survey 1)**

17 Some special education directors are responsible for more than one school district. How many school districts does your special education program serve?
17.1 _____ (number of districts)

18 How many special education students does your program serve?
18.1 _____

19 How many special education teachers (full-time equivalent) work with the special education students?
19.1 _____

20 Do you work with any of the following administrators on a regular basis to plan for and make decisions about computers and their use in the special education program?
20.1 District administrators
20.2 Building administrators
20.3 Other special education adminstrators
20.4 DK/Refused

21 Do you work with a committee on a regular basis to plan for and make decisions about computers and their use in the special education program?
21.1 Yes
21.2 No
21.3 DK/Refused

**(If 21.2 or 21.3, skip to 26)**

22 At what administrative level is this committee for computer use organized?
22.1 District
22.2 Building
22.3 Other
22.3.1 list _____
22.4 DK/Refused

23 How many times does the committee meet per school year?
23.1 _____

**Questions For Special Education Director (Survey 1)**

24 What are the functions for which the committee is responsible?
- 24.1 Set guidelines for evaluating hardware
- 24.2 Set guidelines for evaluating software
- 24.3 Acquire hardware
- 24.4 Acquire software
- 24.5 Allocate hardware
- 24.6 Allocate software
- 24.7 Evaluate computer use
- 24.8 Plan for computer use
- 24.9 Monitor computer use
- 24.10 Review computer use and needs
- 24.11 Obtain or provide computer in-service training
- 24.12 Set curriculum goals for computer use
- 24.13 Set instructional objectives for computer use
- 24.14 Provide technical assistance to computer users
- 24.15 Other
  - 24.15.1 list _____
- 24.16 DK/Refused

25 Does the committee that is responsible for planning computer use for special education include:
- 25.1 Regular education teachers
- 25.2 Regular education administrators
- 25.3 Special education teachers
- 25.4 Special education administrators
- 25.5 DK/Refused

26 Do you personally review or select the computer hardware that is purchased for the special education program?
- 26.1 Yes, review
- 26.2 Yes, select
- 26.3 No, neither
- 26.4 DK/Refused

27 Do you personally review or select software that is purchased for the special education program?
- 27.1 Yes, review
- 27.2 Yes, select
- 27.3 No, neither
- 27.4 DK/Refused

28 Do you participate in the decisions about where or how computer resources for the special education program are distributed?
- 28.1 Yes
- 28.2 No
- 28.3 DK/Refused

**Questions For Special Education Director (Survey 1)**

29 Have you purchased computers or software for special education **administrative applications** using funds appropriated for the special education program?
- 29.1 Yes, computers
- 29.2 Yes, software
- 29.3 No, none of above
- 29.4 DK/Refused

30 Have you purchased computers or software for special education **instructional applications** using funds appropriated for the special education program?
- 30.1 Yes, computers
- 30.2 Yes, software
- 30.3 No, none of the above
- 30.4 DK/Refused

31 Do you provide funds for staff-development activities for computer use?
- 31.1 Yes
- 31.2 No
- 31.3 DK/Refused

32 Are you involved in planning for staff-development activities for computer use in the special education program?
- 32.1 Yes
- 32.2 No
- 32.3 DK/Refused

33 Do you provide release time for special education staff to attend training activities for computer use?
- 33.1 Yes
- 33.2 No
- 33.3 DK/Refused

34 Do you provide incentives for special education staff to attend training activities for computer use?
- 34.1 Tuition reimbursement
- 34.2 Special recognition
- 34.3 Computer equipment
- 34.4 Higher pay
- 34.5 Advancement
- 34.6 Other
  - 34.6.1 please specify _____
- 34.7 No, none are provided
- 34.8 DK/Refused

**Questions For Special Education Director (Survey 1)**

35 Are there formal mechanisms for special and regular educators to communicate among themselves about computers?
- 35.1 Electronic bulletin board (at district level)
- 35.2 Electronic bulletin board (1 or more at building level)
- 35.3 Newsletter
- 35.4 Meetings
- 35.5 Team Teaching
- 35.6 Task Force
- 35.7 Other
  - 35.7.1 specify _____
- 35.8 None
- 35.9 DK/Refused

**(If not (35.1 or 35.2), skip to 37)**

36 Do special education staff use the electronic bulletin board?
- 36.1 Yes
- 36.2 No
- 36.3 DK/Refused

37 Are there computers available for use by special education students?
- 37.1 Yes
- 37.2 No
- 37.3 DK/Refused

**(If 37.2 or 37.3, then 41)**

38 Where are the computers located that are used by special education students?
- 38.1 Special education classrooms
- 38.2 Computer labs
- 38.3 Library
- 38.4 Regular classrooms
- 38.5 Media center
- 38.6 Other
  - 38.6.1 list _____
- 38.7 DK/Refused

39 Are there libraries of software available to special education staff?
- 39.1 Yes
- 39.2 No
- 39.3 DK/Refused

**(If 39.2 or 39.3, skip to 41)**

**Questions For Special Education Director (Survey 1)**

40 Where are these libraries located?
- 40.1 Special education classrooms
- 40.2 Computer labs
- 40.3 Library
- 40.4 Regular classrooms
- 40.5 Media center
- 40.6 District office
- 40.7 Other
  - 40.7.1 list _____
- 40.8 DK/Refused

41 How many staff-development training activities related to computers **and** special education have you attended this school year?
41.1 _____

42 Please estimate the average number of hours of computer training that will have been made available to each teacher by the end of this school year.
42.1 _____

43 Who is responsible for planning staff-development training activities for the special education program?
43.1 (title only) _____

44 Is technical assistance for computers available to the special education staff?
- 44.1 Yes
- 44.2 No
- 44.3 DK/Refused

**(If 44.2 or 44.3, skip to 50)**

45 I would like to learn more about your technical assistance program. I will read a list of possible elements of that program, please indicate which of the following are available in your district.

- 45.1 Provide software
- 45.2 Identify useful software
- 45.3 Demonstrate software
- 45.4 Evaluate software
- 45.5 Program or modify software
- 45.6 Distribute software catalogs
- 45.7 Schedule use of computer equipment
- 45.8 Install or maintain computer equipment
- 45.9 Integrate computers into the curriculum
- 45.10 Other
  - 45.10.1 list _____
- 45.11 DK/Refused

**Questions For Special Education Director (Survey 1)**

46 Who provides technical assistance for computers in your district?
46.1 specify title _____

47 Is this a formal position?
47.1 Yes
47.2 No
47.3 DK/Refused

**(If 47.2 or 47.3, skip to 49)**

48 At what administrative level is this position?
48.1 District
48.2 Building
48.3 DK/Refused

**(Skip to 50)**

49 If not a formal position, at what administrative level is this position?
49.1 District
49.2 Building
49.3 DK/Refused

50 Do you use computers regularly for professional purposes?
50.1 Yes
50.2 No
50.3 DK/Refused

**(If 50.2 or 50.3, skip to 52)**

51 For what purposes do you use computer applications?
51.1 To prepare print-based instructional materials.
51.2 To prepare correspondence and reports
51.3 To manage staff records or student records
51.4 To manage course content materials
51.5 To develop educational plans (IEPs) for students
51.6 To access information sources
51.7 To inventory or monitor supplies, materials, equipment or services
51.8 To modify or develop computer programs
51.9 To measure student abilities
51.10 Other
51.10.1 list _____
51.11 DK/Refused

52 Considering the special education staff in your district, please estimate the percentage who use computers for instruction with their students.
52.1 _____ (to nearest percent, e.g., 35, 72)

## Questions For Special Education Director (Survey 1)

53 Could you give me the name of the Computer Coordinator in your district?
53.1 Name _____

54 Could you give me the phone number of the Computer Coordinator in your district?
54.1 Phone _____

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

**National Center For Educational Statistics (NCES) Information**

1 Record Number (1 - 17068)
1.1 _____

2 State Code (1 - 60)
2.1 _____

3 Agency Number (1 - 99999)
3.1 _____

4 Name Of Education Agency (30 characters)
4.1 _____

5 Agency Type Code (1 - 2)
5.1 _____

6 Student Counts Total (0 - 999999)
6.1 _____

7 Student Counts Special Ed IEP (0 - 999999)
7.1 _____

8 Additional Information - Location By Region (1 - 4)
8.1 _____

**Survey Information**

9 Role Number (1=Spec Ed Dir, 2=Computer Coord 3=Spec Ed Teach)
9.1 _____

**Computer Coordinator/Special Ed Teacher Information**

10 Salutation (Mr., Ms., Mrs., Miss, Dr.)
10.1 _____

11 First Name
11.1 _____

12 Middle Initial
12.1 _____

13 Last Name
13.1 _____

14 Business Phone Number
14.1 _____

15 Date Of Interview
15.1 _____

16 Time Of Interview
16.1 _____

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

17 What is your official title?
17.1 _____

18 What grade(s) or group do you work with?
18.1 K
18.2 1
18.3 2
18.4 3
18.5 4
18.6 5
18.7 6
18.8 7
18.9 8
18.10 9
18.11 10
18.12 11
18.13 12
18.14 Teachers
18.15 DK/Refused

19 How many schools do you work with?
19.1 _____

20 Do you work with any of the following administrators on a regular basis to plan for and make decisions about computers and their use in the special education program?
20.1 District administrators
20.2 Building administrators
20.3 Other special education adminstrators
20.4 No
20.5 DK/Refused

21 Do you work with a committee on a regular basis to plan for and make decisions about computers and their use in the special education program?
21.1 Yes
21.2 No
21.3 DK/Refused

**(If 21.2 or 21.3, skip to 26)**

22 At what administrative level is this committee for computer use organized?
22.1 District
22.2 Building
22.3 Other
22.3.1 list _____
22.4 DK/Refused

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

23 How many times does the committee meet per school year?
23.1 _____

24 What are the functions for which the committee is responsible?
24.1 Set guidelines for evaluating hardware
24.2 Set guidelines for evaluating software
24.3 Acquire hardware
24.4 Acquire software
24.5 Allocate hardware
24.6 Allocate software
24.7 Evaluate computer use
24.8 Plan for computer use
24.9 Monitor computer use
24.10 Review computer use and needs
24.11 Obtain or provide computer in-service training
24.12 Set curriculum goals for computer use
24.13 Set instructional objectives for computer use
24.14 Provide technical assistance to computer users
24.15 Other
24.15.1 list _____
24.16 DK/Refused

25 Does the committee that is responsible for planning computer use for special education include:
25.1 Regular education teachers
25.2 Regular education administrators
25.3 Special education teachers
25.4 Special education administrators
25.5 DK/Refused

26 Are there computers available for use by special education students?
26.1 Yes
26.2 No
26.3 DK/Refused

**(If 26.2 or 26.3, skip to 45)**

27 Do you personally review or select the computer **hardware** that is purchased for your use in the special education program?
27.1 Yes, review
27.2 Yes, select
27.3 No, neither
27.4 DK/Refused

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

28 Do you personally review or select the computer **software** that is purchased for your use in the special education program?
- 28.1 Yes, review
- 28.2 Yes, select
- 28.3 No, neither
- 28.4 DK/Refused

29 Do you participate in the decisions about where or how computer resources for the special education program are distributed?
- 29.1 Yes
- 29.2 No
- 29.3 DK/Refused

30 Have you purchased computers or software for special education **administrative applications** using funds appropriated for the special education program?
- 30.1 Yes, computers
- 30.2 Yes, software
- 30.3 No, none of above
- 30.4 DK/Refused

31 Have you purchased computers or software for special education **instructional applications** using funds appropriated for the special education program?
- 31.1 Yes, computers
- 31.2 Yes, software
- 31.3 No, none of the above
- 31.4 DK/Refused

32 Is instructional software used in the special education program?
- 32.1 Yes
- 32.2 No
- 32.3 DK/Refused

**(If 32.2 or 32.3, skip to 36)**

33 What type of instructional software is used in the special education program?
- 33.1 Drill/practice
- 33.2 Tutorial
- 33.3 Games
- 33.4 Simulation
- 33.5 Word processing
- 33.6 Other
  - 33.6.1 please specify _____
- 33.7 DK/Refused

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

34 What grade levels use instructional software?
- 34.1 K
- 34.2 1
- 34.3 2
- 34.4 3
- 34.5 4
- 34.6 5
- 34.7 6
- 34.8 7
- 34.9 8
- 34.10 9
- 34.11 10
- 34.12 11
- 34.13 12
- 34.14 DK/Refused

35 For what subject areas is instructional software used?
- 35.1 Mathematics
- 35.2 Science
- 35.3 Language Arts
- 35.4 Social Studies
- 35.5 Foreign Languages
- 35.6 Fine Arts
- 35.7 Other
  - 35.7.1 please specify _____
- 35.8 DK/Refused

36 Are there formal mechanisms for special and regular educators to communicate among themselves about computers?
- 36.1 Electronic bulletin board (at district level)
- 36.2 Electronic bulletin board (1 or more at building level)
- 36.3 Newsletter
- 36.4 Meetings
- 36.5 Team Teaching
- 36.6 Task Force
- 36.7 Other
  - 36.7.1 specify _____
- 36.8 None
- 36.9 DK/Refused

**(If not (36.1 or 36.2), skip to 38)**

37 Do special education staff use the electronic bulletin board?
- 37.1 Yes
- 37.2 No
- 37.3 DK/Refused

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

38 Do special and regular education teachers share computer resources?
- 38.1 Yes, hardware
- 38.2 Yes, software
- 38.3 Yes, other
  - 38.3.1 specify _____
- 38.4 No, not at all
- 38.5 DK/Refused

39 Do special education and regular education students use computers together?
- 39.1 Yes, together in regular education classes
- 39.2 Yes, together in computer lab
- 39.3 Yes, together in media center/library
- 39.4 Yes, together in another location
  - 39.4.1 list _____
- 39.5 No
- 39.6 DK/Refused

**(If 39.5 or 39.6, skip to 41)**

40 Please estimate the number of times per month that special education students and regular students use computers together.
- 40.1 On a daily basis
- 40.2 Less than daily but more than once a week
- 40.3 Weekly
- 40.4 Less than weekly but more than once a month
- 40.5 Monthly
- 40.6 Less than monthly
- 40.7 DK/Refused

41 Approximately how many computers in each district are available for special education students?
- 41.1 _____

42 Where are the computers located that are used by special education students?
- 42.1 Special education classrooms
- 42.2 Computer labs
- 42.3 Library
- 42.4 Regular classrooms
- 42.5 Media center
- 42.6 Other
  - 42.6.1 list _____
- 42.7 DK/Refused

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

43 Are there libraries of software available to special education staff?
- 43.1 Yes
- 43.2 No
- 43.3 DK/Refused

**(If 43.2 or 43.3, skip to 45)**

44 Where are these libraries located?
- 44.1 Special education classrooms
- 44.2 Computer labs
- 44.3 Library
- 44.4 Regular classrooms
- 44.5 Media center
- 44.6 District office
- 44.7 Other
  - 44.7.1 list _____
- 44.8 DK/Refused

45 How many staff-development training activities related to computers **and** of potential benefit to the special education program have you **attended** this school year?
45.1 _____

46 How many staff-development training activities related to computers **and** of potential benefit to the special education program have you **led** this school year?
46.1 _____

47 Do you receive incentives to attend training activities for computer use?
- 47.1 Tuition reimbursement
- 47.2 Special recognition
- 47.3 Computer equipment
- 47.4 Higher pay
- 47.5 Advancement
- 47.6 Other
  - 47.6.1 please specify _____
- 47.7 No, none are provided
- 47.8 DK/Refused

48 Is technical assistance for computers available to the special education staff?
- 48.1 Yes
- 48.2 No
- 48.3 DK/Refused

**(If 48.2 or 48.3, skip to 54)**

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

49 I would like to learn more about your technical assistance program. I will read a list of possible elements of that program, please indicate which of the following are available in your district.
- 49.1 Provide software
- 49.2 Identify useful software
- 49.3 Demonstrate software
- 49.4 Evaluate software
- 49.5 Program or modify software
- 49.6 Distribute software catalogs
- 49.7 Schedule use of computer equipment
- 49.8 Install or maintain computer equipment
- 49.9 Integrate computers into the curriculum
- 49.10 Other
  - 49.10.1 list _____
- 49.11 DK/Refused

50 Who provides technical assistance for computers in your district?
- 50.1 specify title _____

51 Is this a formal position?
- 51.1 Yes
- 51.2 No
- 51.3 DK/Refused

**(If 51.2 or 51.3, skip to 53)**

52 At what administrative level is this position?
- 52.1 District
- 52.2 Building
- 52.3 DK/Refused

**(Skip to 54)**

53 If not a formal position, at what administrative level is this position?
- 53.1 District
- 53.2 Building
- 53.3 DK/Refused

54 Do you use computers regularly for special education instructional purposes?
- 54.1 Yes
- 54.2 No
- 54.3 DK/Refused

**(If 54.2 or 54.3, skip to 56)**

**Questions For Computer Coordinator/Special Ed Teacher (Survey 2)**

55 For what purposes do you use computers for special education instruction?
- 55.1 Present new instructional material
- 55.2 Allow practice with current instructional material
- 55.3 Provide simulations linked to course material
- 55.4 Develop/improve student writing/composition skills
- 55.5 Reward students
- 55.6 Expose students to the subject of computers
- 55.7 Develop student skill in using computers to solve problems
- 55.8 Develop student skill in creating or modifying computers
- 55.9 Allow student to communicate electronically or access information
- 55.10 DK/Refused

56 For what other purposes do you use computers?
- 56.1 Prepare print-based instructional materials.
- 56.2 Prepare correspondence and reports
- 56.3 Manage staff records or student records
- 56.4 Manage course content materials
- 56.5 Develop educational plans (IEPs) for students
- 56.6 Access information sources
- 56.7 Inventory or monitor supplies, materials, equipment or services
- 56.8 Modify or develop computer programs
- 56.9 Assess student abilities
- 56.10 Other
  - 56.10.1 list _____
- 56.11 DK/Refused

# Appendix B

# Variables for Correlation Analysis

**Administrative Grant**

**Variables for Correlation Analysis**

AINVI General indicator of special education administrative involvement in computer use in the district through individual activities

AINVC General indicator of special education administrative involvement in computer use in the district through committee processes

AINVO Combination of AINVI and AINVC as overall general indicator of special education administrative involvement in computer use in the district

TINVI General indicator of special education staff involvement in computer use through individual activities

TINVC General indicator of special education staff involvement in computer use through committee processes

TTRNG Special education teacher participation in computer-related inservice training

HARSF Availability and accessibility of hardware and software to special education students and staff

TRNTA Availability and accessibility of computer-related training and technical assistance to special education staff

STUIA Instructional applications available to special education students

#1

| Var X | Var Y |
|---|---|
| | |
| AINVI | TINVI |
| | TINVC |
| | TTRNG |
| | HARSF |
| | TRNTA |
| | STUIA |

#2

| Var X | Var Y |
|---|---|
| | |
| AINVC | TINVI |
| | TINVC |
| | TTRNG |
| | HARSF |
| | TRNTA |
| | STUIA |

#3

| Var X | Var Y |
|---|---|
| | |
| AINVO | TINVI |
| | TINVC |
| | TTRNG |
| | HARSF |
| | TRNTA |
| | STUIA |

#4

| Var X | Var Y |
|---|---|
| | |
| STUIA | TINVI |
| | TINVC |
| | TTRNG |
| | HARSF |
| | TRNTA |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ADMIN QUEST | 17 items used | 20 | 23 | 24 | 26 | 27 | 28 | 29 | 30 |
| | | 31 | 32 | 33 | 34 | 38 | 40 | 42 | 45 |
| | | 52 | | | | | | | |
| CC/TCH QUEST | 13 items used | 23 | 24 | 27 | 28 | 29 | 33 | 35 | 42 |
| | | 44 | 45 | 46 | 49 | 55 | | | |

# Appendix C

## Survey Instruments for Phase II

**School District Demographic Information** (to be completed by the Special Education Administrator) requested information on:

- Total Enrollment
- Special education enrollment (total and by disability type)
- Number of schools by level (Elementary, Middle, High)
- Number of special or alternative education centers, if any, with populations served
- Population served by these centers
- Total number of teachers (including special education) by level
- Number of special education teachers, by handicapping condition(s) served and level of placement
- District organizational structure (chart, if possible)
- Profile, by ethnicity
- Socioeconomic profile

(District level documents which may supplement this information.)

**Local School Demographic Information** (to be completed by the Lead Teacher) requested information on:

- Type of school
- Position or title
- Special education student enrollment (by disability type and the number served)
- Total number of teachers (including special education) by level
- Number of special education teachers, by handicapping condition(s) and level of placement
- Socioeconomic profile of the community served by the school
- Ethnic profile of the community served by the school

**School District Hardware Information** (to be completed by the Computer Coordinator) requested information on:

- Current availability of computers and computer related equipment overall in the district
- Current availability of computers and computer related equipment in special education in the district
- Number of computers by brand available overall in the district
- Number of computers by brand available in special education in the district
- Approximate student: computer ratio overall
- Approximate student: computer ratio in special education
- Approximate percentage of the district's total budget devoted to hardware purchase overall
- Approximate percentage of the district's total budget devoted to hardware purchase in special education
- The most common location of computers for use by students
  (Teachers were asked to rank the frequency of use overall and in special education by locate. Choices included
  Classroom (1-3 computers)
  Mini lab (4-9)
  Lab (>9) and
  Other _____
- The percentage of the total number of computers available shared between regular and special education programs
- The district's hardware selection procedures
- The district's hardware acquisition procedures
- Any new or unusual computer configurations in the district (e.g., networks, specially adapted equipment, etc.)

**School District Software Information** (to be completed by the Computer Coordinator) requested information on:

- Estimate of the number of computer software titles by type available in the district, overall and in special education

  Drill and practice
  Tutorial
  Simulation/problem solving
  Educational games
  Word processing
  Desktop publishing
  Graphics
  Integrated package
  Database
  Spreadsheet
  Instructional management
  Assessment
  Programming
  Computer literacy
  Keyboarding
  Telecommunications
  Adaptive support
  Other _____

- Approximate percentage of the software available in the district shared between regular and special education programs

- Ranking of the 5 software programs that have the highest levels of use in the district, overall and in special education

- Approximate percentage of the district's total budget devoted to software purchase overall and in special education

- The district's software evaluation procedures

- The district's software selection procedures

- The district's software acquisition procedures

# Appendix D

## Interview Instrument

Informant Data

Name
School address
School phone
Home address (if possible)
Home phone (if possible)
Title
Description of responsibilities
Description of special education students taught by disability type and level of service (for special education teachers only)

## Current and past levels of use for administrative tasks in the position of special education administrator

### Background

[A][C][1] For what administrative purposes are computers being used in the district?

[A][C] What is the history of administrative use of computers in the district?

### Special Education Specific

[A] How are you and your staff (not teachers) currently using computers for administrative purposes?

[A] Approximately how much time each day (or each week) do you yourself use a computer to accomplish some administrative task?

[A] For what administrative purposes have you used them in the past?

---

[1] Key to Information Sources:

[A] Special Education Administrator
[C] Computer Coordinator
[L] Lead Special Education Teacher
[T] Other Special Education Teachers
[F] Form
[D] Document containing this information, if available
[O] Observation

[A] Are you currently using them more or less than in the past? Why?

## Current and past experience with computers, both professionally (outside the job of special education administrator) and for personal use

### General Use

[A] For what purposes (other than those directly related to special education) have you used or are you using computers?

[A] Approximately how much time each day or each week did you spend using computers for these purposes? How much are you currently spending?

[A] What initially stimulated your interest in computer technology and what have you done to maintain that interest?

### Special Education Specific Use

[A] How did you use computers previously in other special education positions?
Administrative tasks? Which ones?
In instruction? How?

[A] Approximately how much time each day or each week did you spend using computers for these purposes? How much are you currently spending?

## Current and past level of involvement in district-level technology planning activities

### Background

[A][C][L][D] What is the history of technology planning in the district?

[A][C][L] Does current technology planning involve individuals at various levels of the school system (e.g., central staff, building administrators, teachers)?

[A][C][L] Does current technology planning involve individuals from various program areas (e.g., regular and special education, various content areas)?

[A][C] If there currently is a committee organized at the district level which is responsible for technology planning, describe its:

- Scope of work
- Frequency and regularity of meetings
- Leadership and support for the committee
- Limits of authority
- Resources allocated
- Range of representation in membership of committee

[A][C][L] Are there committees organized at the school level which are responsible for technology planning and implementation within a single school? If so, what are they (in general terms):

- Scope of work
- Frequency and regularity of meetings
- Leadership and support for the committee
- Limits of authority
- Resources allocated
- Range of representation in membership of committee

[A][C] How are the activities of school-based technology committees coordinated?

[A][C][D] Is there an existing technology plan or is one in the process of being developed?

- What is the scope of the plan (district or school)?
- How and by whom was the plan prepared?
- What is the content of the plan?
- What are the methods and scope of the plan's dissemination?

[A][C][L] Has the curriculum been modified to allow for and support the use of microcomputer technology?

[A][C][D] Has there been any formal evaluation related to use of microcomputer technology in the district?

- Evaluation of the implementation process itself?
- Evaluation of the effectiveness of computer? applications for providing instruction in specific areas?

**Special Education Specific**

[A][C] What role have you (or has the special education administrator) played in the past in district level technology planning?

[A][C] What role are you currently playing?

[A][C] Do you foresee any changes in district level technology planning processes in the near future?

[A] Do you anticipate any changes in your role in the process of technology integration in the near future?

## History of hardware acquisition in the district and amount of hardware currently available in regular and special education programs

### Background

What is the current availability of computers and computer related equipment in the district?

[F][C][D] Numbers and types of computers
[F][C][D] Locations of computers
[F][C] Student: computer ratio
[A][C][L][F] Any new or unusual configurations

[F][C] How is hardware generally acquired?
[A][C][L][D] Hardware selection procedures
[C][D] Hardware acquisition procedures
[F][C] What is the approximate percentage of the district's total budget allocated for the purchase of hardware for all student use?

[A][C][L] How do current hardware acquisition practices differ from those of the recent past?

[A][C][L][D] How are decisions made about placement of computers and related equipment?
Are they guided by explicit rules or criteria?
Is consideration given to equity of access (including access by special education students)?

### Special Education Specific

What is the current availability of computers and computer related equipment in the special education program?

[F][D] Numbers and types of computers
[F][D] Locations of computers
[F] Student:computer ratio
[A][C][L][F] Any new or unusual configurations

| | |
|---|---|
| [A][C][F] | How is hardware for use in special education programs generally acquired? |
| [A][C][L][D] | Hardware selection procedures |
| [A][C][D] | Hardware acquisition procedures |
| [F][C] | What is the approximate percentage of the district's total budget allocated for the purchase of special education specific hardware? |
| [A][C][L] | How do current practices related to hardware acquisition for the special education program differ from those of the recent past? |

## History of software acquisition in the district and amount of software currently available in regular and special education programs

### Background

| | |
|---|---|
| [C][F][D] | What is the current availability of software in the district?<br>Number of programs available in the system<br>By application type<br>By subject |
| [C] | Availability of site licenses and other special software licensing agreements |
| [C] | How is software generally acquired? |
| [C][L][T][D] | What are your software selection procedures?<br>Outside sources of information?<br>Formal evaluation procedures? |
| [C][L][D] | What are your software acquisition procedures? |
| [F][C] | What is the approximate percentage of the district's total budget allocated for the purchase of hardware for all student use? |
| [C][L][T] | How do current software acquisition practices differ from those of the recent past? |
| [C][L] | Where is software stored? |
| [C][L][D] | How is circulation managed? |
| [C][D] | Are decisions about storage and circulation guided by explicit rules or criteria? |

### Special Education Specific

| | |
|---|---|
| [F][C][L][T][D] | What is the current availability of software in the special education program? |

Number of programs available for use in the special education program
By application type
By subject

[A][L][T] Do professional special education staff feel that the software currently available meets the needs of their students? If not, why not?

[A][C] How is software that is used for special education generally acquired?

[A][C][F] What is the percentage, approximately, of the district's total budget allocated for the purchase of software for special education specific use?

[A][C][L][T][D] What are your software selection procedures?
Outside sources of information?
Formal evaluation procedures?

[A][C][L][D] What are your software acquisition procedures?

[A][C][L][T] How do current practices related to software acquisition for the special education program differ from those of the recent past?

[C][L][T] Where is software that is used in the special education program stored?

[C][L][T] How is its circulation managed?

[C][L][T][D] Are decisions about storage and circulation of software used in special education guided by explicit rules or criteria?

## History and current level of planning efforts focusing on computer applications in special education

### Special Education Specific

[A][C][L][D] What planning has taken place which specifically focused on the use of computers in special education programs?

[A][C][L] Has this planning been closely linked to district level planning for general education or has it occurred as a more or less independent process?

[A][L][T] Is planning for use in special education programs currently an ongoing process? If not, why not?

[A][C][L] Do you feel that special education specific planning has achieved demonstrable results? Please specify.

[A][C][L] Have special education teaching staff been encouraged to use computers to plan their instructional programs?

[A][C][L][T][D] Are procedures in place to link computer technology to specific instructional goals?
- IEP
- Academic
- Non-academic

[A][C][L][T] Are procedures in place to encourage communication between teachers or between teachers and other staff about classroom use of technology?

## History and current level of appropriate training and technical assistance for special education teaching staff

### Background

Are there training programs available for teachers and other staff in the use of microcomputer technology? If so, describe:

[A][C][D] Range
[C] Philosophy
[C][L][T] Accessibility
[C][L][D] Schedule
[C] Organization
[C][L][T] Methods of instruction

[C] How were these training programs developed (i.e., history)?

[C][L][T] Is technical assistance available to teachers and other staff? What kinds?
- Help in locating appropriate software?
- Help in designing lesson which use computers effectively?
- Help during actual use of computers in instruction?
- Who provides technical assistance?

[C][L] What is the history of technical assistance availability related to technology in the district?

[C][L] Are incentives provided or participation enabled in either attending formal training or seeking technical assistance?

[C][L] Was this true in the past?

**Special Education Specific**

[A][L][T] Are training programs appropriate for the needs and interests of special education teachers?

[C][A][L][T] Does technical assistance explicitly support the unique needs of special education teachers (e.g., use of adaptive peripherals; location, adaptation or development of software applications to meet specific student needs)?

[A][L][T] Are currently available training and technical assistance more or less appropriate for the needs of special education teachers than in the past?

[A][C] Does it appear that there will be changes in the amount or appropriateness of training and technical assistance in the near future?

## History and current level of use of computer technology by special education students (in mainstream and special education coursework or in support in their instructional programs)

**Background**

[F][C][D] In what program areas are microcomputers used?
Describe frequency and prevalence of use in each area.

[F][C][D] What application types are currently in use?

- Drill and practice
- Tutorial
- Simulation/problem solving
- Educational games
- Word processing
- Desktop publishing
- Graphics
- Integrated package
- Database
- Spreadsheet
- Instructional management
- Assessment
- Programming
- Computer literacy
- Keyboarding

Telecommunications
Adaptive support
Other _____

[F][C][D] For what purposes are they used? (Classify as indicated above.)

[A][C][L][T] How would you describe the growth of technology use at the classroom level in the district (slow vs. fast, grass roots vs. use directed from above, widespread vs. concentrated, etc.)?

**Special Education Specific**

[A][C][L][T][F][D] What application types are currently being used in the special education program? (Classify as indicated above.)

[A][C][L][T][F][D] For what purposes are they used in the special education program? (Classify as indicated above.)

[A][C][L][T][D] Is use being made of adaptive peripherals, specialized microcomputer based devices (e.g., communications devices), or other special purpose equipment in the special education program? How widespread is this use?

[A][C][L][T] How would you describe the growth of technology use at the classroom level in the special education program (slow vs. fast, grass roots vs. use directed from above, widespread vs. concentrated, etc.)?

[A][L][T] What are the feelings of special education teachers about the current state of microcomputer technology for instruction in the district?

[A][L][T] What are the feelings of special education teachers about the potential usefulness of microcomputer technology for instruction in the district?

[A][C][L][T] Approximately what percent of special education teachers are currently using computers in instruction?

[A][C][L][T] Approximately how often does the average instructional computer-using special education teacher use computers?

[A][C][L][T] In what settings are computers most often used by special education students?