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ABSTRACT

This curriculum outline is designed for trainers of practitioners who use technology with students with disabilities. It offers an alternative approach to technology-specific training, with the student as the focus, the technology as one potential solution for providing better access to instruction, and the matching of functional tasks required in the learning environment with the capabilities of the technology. The outline encourages service providers to view the student's problem within the context of the entire learning environment, examine the range of technology solutions available, and choose the most appropriate devices or systems. The curriculum addresses six functional tasks, including reading, speaking, writing/manipulating, seeing/visual processing, hearing/listening, and cognitive processing. For each task, the curriculum outline includes some or all of the following: student description, assessment considerations, task requirements, and potential technology solutions. The curriculum outline also covers issues concerning multiple disabilities and evaluation of technology. A section on references and resources lists over 100 readings, approximately 40 training materials, 10 curricula, 12 projects, 15 newsletters/journals, and 2 directories of database information. (JDD)

Comprehensive Assistive Technology Curriculum Outline: A Functional Student-Centered Approach

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PREFACE

The Comprehensive Assistive Technology Curriculum Outline: A Functional Student-Centered Approach is one in a series of products developed by the Center for Special Education Technology under its Assistive Technology theme.

In early 1989 the Center consulted a group of assistive technology experts who identified a need for an outline to assist trainers in comprehensive coverage of assistive technology applications. They cautioned that any curriculum must not promote a "technology for technology's sake" approach and must be truly comprehensive in nature. With those directives, the development of this outline was pursued.

The result of the Center's efforts is a curriculum outline that provides an alternative approach to technology-specific training. The student is the focus of this curriculum, and the technology is presented as one potential solution for providing better access to instruction. Functional tasks required in the learning environment are the framework for examining these potential solutions. It is hoped that this unique approach will allow the trainer to think beyond the standard technology solutions and look closely at the capability of the technology and match it with the requirements of functional tasks that a student cannot perform without assistance.

The Center sees this outline as dynamic in nature, open for expansion and modification. The outline was developed with extensive input from experienced trainers and experts in assistive technology utilization. However the training described throughout the outline has never been field-tested. The Center offers this outline as a resource to the special education technology field. We welcome your input. Please contact us with your suggestions and modifications or use the feedback form provided at the end of this document.

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PART 1

OVERVIEW

Technology, in its many facets, is rapidly coming to permeate today's educational settings, not the least of which are the special education classrooms. Assistive technology, and all that it implies, is quickly moving into these classrooms because it provides access to instruction to many students with disabilities. These students can access, maintain, and improve their functioning in learning, living, work, and recreation environments through the proper use of technology.

Many school districts are beginning to address the training needs of their teachers and related service personnel in the area of assistive technology. Inservice courses are being offered at the district level and university level. In some areas institutions are contracted to provide the needed training. Although training in the area of assistive technology has a relatively short history, patterns in its delivery have been noted and it is receiving criticism by many. Two of the major criticisms include the tendency to focus on the technology rather than the individual learner and the lack of comprehensiveness of the training program. The curriculum outline presented here attempts to address both of those concerns.

This outline is designed for the trainers—the individuals or institutions who train the practitioners in the use of technology for students with disabilities. The outline of topics to be covered includes the knowledge areas that all professionals working with technology and individuals with disabilities ultimately need to know. Ample resource materials are also included to allow the trainer to build a solid program.

ACCESS TO INSTRUCTION

Special educators modify and adapt materials and the presentation of information daily for the learner with disabilities; however, all too frequently much is lost because of the student's inability to process the information. Access to instruction is not fully achieved. Additionally, students need to use cognitive and communication skills to provide feedback to the teacher about what they have learned. Adequate skill levels for effective feedback are often lacking. While the present day computer technologies and many emerging technologies do not provide cures for these problems, they can take the modification efforts of special education teachers a step or two beyond what has been possible in the past. Three major ways in which the technology can accomplish this are:

- by allowing alternative methods of contributing information into the computer system;
- by allowing information to be expressed in alternative ways; and

- by processing the information in special ways including converting it from one modality to another.

For example, access to instruction can be facilitated for some by converting written information into auditory or tactile information or, for others, by converting nonverbal responses into written and spoken responses. New aspirations of access to instruction can be achieved. The key to this change lies with the professionals working with the learners. They must know the capability of the technology, how to match it appropriately to the learner's needs, and how to instruct the learners to use it to the best of their ability.

A Student-Centered Approach

The student-centered approach employed here recognizes the primary reason for using assistive technology as providing individuals with a means of communication and access to instruction. Therefore, the information about technology use is related to individual student needs. The rationale for the use of technology presented in any training session must demonstrate the importance of the end user of the technology and the end goal — better access to and participation in the educational process.

In this outline, student needs are defined functionally in terms of educational tasks and the barriers to learning they present. The training must enable the educator to make the match between the student's need and the capabilities of the technology as they relate to the educational goal.

Functional Educational Tasks

Many special education professionals have been trained and certified for teaching a specific category of disability. Most, however, when presented with a student in their classroom, do not see the disability per se but see the student frustrated by a specific educational task or function: One student cannot read, for example, or another cannot solve a problem. Technology provides new ways for professionals to modify materials and techniques to help the students work around the task that presents barriers. This curriculum outline addresses seven specific functional tasks. Each is briefly described here.

Reading: From name tags and bulletin boards to textbooks and worksheets, the learning environment is filled with reading tasks, whether consciously presented or not. The student who cannot read has difficulty accessing all of the information available.

Speaking: The sharing of information between students and between the teacher and the student is an ongoing event in the learning environment. The student who cannot speak has difficulty participating in this social learning process.

Writing/Manipulating: The task of writing is used to practice mental computations, store thoughts, and illustrate what has been learned. Other

manipulative materials are used as primary learning materials from pre-school through high school. The student who cannot manipulate or write cannot fully participate in these classroom activities.

Seeing: Visual information surrounds the learning environment and many of the traditional materials are visually presented. The student who has difficulty seeing and processing visual information is left out of many valuable learning opportunities.

Hearing: Auditory information is frequently used in schools to deliver lectures, as the basis for social interactions, and the provision of safety information. While it is generally accompanied by other types of information, the student who cannot process the auditory information misses much of what is presented in the learning environment, both formally and informally.

Cognitive Processing: Most academic tasks require cognitive processing skills but a large majority of other tasks in the learning environment require cognitive processing as well. The student who has limited abilities in this area will find it more difficult to succeed in the school setting.

Comprehensive Training

Access problems do not exist in isolation of other problems or other environments. The comprehensive approach used in this curriculum is designed to enable professionals to make the best decision for the whole student. Training programs cannot be limited to a single facet of technology use but rather they must include the following other components:

- skills/capabilities assessment,
- needs/goals assessment,
- device and software selection,
- training of all involved persons,
- integration into multiple environments, and
- monitoring/formative evaluation procedures.

The comprehensive approach encourages service providers to view the student's problem within the context of the entire learning environment, examine the range of technology solutions available for the identified problem area and other related problems, and choose the devices or systems that meet all or the majority of the student's needs. Implementing the chosen solution follows with the training of the student and appropriate personnel, integrating the solution into the learning environment, and monitoring its use and the changing needs of the student within that environment.

CURRICULUM ORGANIZATION

This curriculum outline is divided into three parts: rationale and overview, the functional tasks and technology solutions, and implementation issues.

It begins with an introductory module that covers the student-centered rationale and general knowledge areas. This basic information module sets the stage for all the other modules.

The next six modules are organized by functional tasks presented in the learning environment. When a close examination is made of this environment, two areas of skills are found to be essential: the ability to communicate effectively and the ability to process information. Students who cannot perform these skills well need modifications in the school environment to succeed. Six functional tasks are addressed, each in a separate module, with student description, assessment considerations, task requirements, and potential technology solutions reviewed for each task. The six tasks include reading, speaking, writing/manipulating, seeing/visual processing, hearing/listening, and cognitive processing.

The student with multiple disabilities has problems performing many of these functional tasks and finding access solutions is a complex task. Issues related to multiple disabilities are covered in Module 8. In modules 2-8, the focus is on physical access issues, not the methods or content of instruction. The outline does not cover behavior disorders and the use of technology as an instructional medium to address attentional deficits and related disorders.

The ninth and final module addresses integration and the ongoing evaluation of the technology to meet students needs. These issues cut across all functional tasks and are easier to present in a single module than as a part of all six functional tasks.

WAYS TO ORGANIZE TRAINING

Suggested here are three possible ways to use the outline, keeping in mind there is no right way. The outline is simply one group's framework for presenting the information considered to be important in all training programs.

The curriculum outline, as written, is organized by functional task. It looks at tasks that students are frequently asked to perform in the learning environment and presents solutions or alternative ways to presenting information required by the task. It allows the trainer to move away from an emphasis on disability categories or specific devices. A session on reading, for example, may cover technology solutions for the nonreader, be that person cognitively disabled, visually impaired, or perceptually impaired. The focus is on alternative methods of presenting written information. This approach uses the modules as written. They could be taught as individual classes or if time is short, they can be combined. This approach may be most useful for the trainer who has not designed an assistive technology training program yet or for an audience that has virtually no experience in technology.

A second approach is to use a standard disability framework. Many districts have training programs in place and it is not feasible to move away from the conceptual framework of other training areas. In this case, training could center around a disability group, such as the learning disabled. Information from each of the modules, as it pertains to the selected population, could be pulled and presented in one or more training sessions. This

approach lends itself to more homogeneous audiences. The trainer would need to make extra efforts to present the philosophy behind this outline, that it is student-centered focusing on the functional educational task, not the disability or a device.

Another alternative use for the outline is to use it as a checklist to assure the inclusion of all the information in existing training. Limited budgets and available time may not allow the addition of a new training session, let alone a series. The outline covers what information is thought to be important for the professional to know, and can be used to guide what should be infused into existing courses. This approach is particularly useful to the preservice trainer where new courses are very difficult to develop and approve.

Whatever approach is taken, it is important to convey to the audience that the student is the center of focus in the instructional process and to serve the student best, all possible solutions must be considered. It is also important to stress that the role of the interdisciplinary team is as important in training as it is in the evaluation and assessment process. Trainers are encouraged to involve all disciplines in the preparation and implementation of the training program.

PART 2

TRAINING MODULES

MODULE 1

A STUDENT-CENTERED APPROACH

This first module outlines the philosophy behind the student-centered approach. The outline focuses on the needs of the student and how technology can provide greater access to learning for the student. This approach capitalizes on the decision-making framework already used by educators and other service providers by taking the comprehensive picture of the student and indicating when technology could be considered as an option to enhance the student's access to instruction.

This module covers the broad components of the curriculum (assessment, selection, training, integration, and evaluation) present in each of the ensuing functional task modules. In some cases, principles of good practice are not covered in detail or not covered at all. For example, the need for a complete assessment of the student is assumed and not discussed here. This is primarily an assistive technology outline, and it was felt that these principles are either already known by special educators or readily available from other sources.

I. Overview
   - A. Comprehensiveness
     1. Systematic/ongoing evaluation
        - a. analysis of current student skills/strengths
        - b. analysis of current student needs
        - c. analysis of continuing changes and future needs
     2. Access to environments
        - a. examines environment performance demands (e.g., home, school, work, community)
        - b. identifies barriers
        - c. identifies technology solutions/alternatives
   - B. Student-centered approach
     1. Focus on needs of student to access learning
        - a. current capabilities and skills
          - (1) student's strengths
          - (2) current successful approaches to the educational task
          - (3) other academic strengths
          - (4) student interests
        - b. short-term goals
        - c. long-range goals
        - d. requirements of environment through analysis of the educational tasks
        - e. barriers to learning

(1) requirements as barriers in the environment
(2) solutions which have not been effective

2. Focus on student, not specific technology pieces
   a. identification of potential solutions/strategies
      (1) solutions which do not involve technology
      (2) technological solutions
      (3) strategies
   b. match capabilities of technology to student needs

II. Assessment
   A. Functional requirements of the learning environment
      1. Reading
      2. Speaking
      3. Writing/manipulation
      4. Hearing/listening
      5. Cognition/cognitive skills
         a. indication of preferences
         b. memory
         c. attention
         d. integration/assimilation of skills
         e. problem solving
         f. comprehension
      6. Seeing/visual processing
   B. Assessment considerations of the student
      1. Barriers to learning
         a. communication
         b. information processing
         c. others
      2. Role of environments
      3. Current skills/skill level
         a. motor
         b. speech/language
         c. academic
         d. social/personal
         e. psychological
         f. problem solving
      4. Current needs
      5. Current solutions
      6. Appropriateness of technology solution
      7. Potential solutions/strategies
      8. Long-range goals
   C. Multidisciplinary team approach
      1. Team members
         a. student
         b. parents
         c. teachers
         d. therapists
         e. technology specialist
         f. administrators

g. psychologists
h. counselors
i. medical personnel
j. others as appropriate

2. Team members' roles
3. Assessment strategies
   a. positioning
   b. multiple environments
   c. use of adaptive equipment
   d. functional tasks
   e. ongoing

D. Goals/outcomes for student
   1. Academic
   2. Daily living
   3. Vocational
   4. Communication
   5. Recreation
   6. Social

III. Selection of Solutions/Strategies
   A. Options
      1. Modification or change of nontechnology areas
         a. learning environment
         b. materials
         c. instructional techniques
         d. curriculum
         e. incentives
      2. Selection of technology solution
         a. low to high technology alternatives
         b. low to high cost alternatives
   B. Criteria for selection of technology-based solution
      1. Device
         a. appropriate technological design to meet student needs/abilities
         b. availability within reasonable time span
         c. portability
         d. durability
         e. reliability
         f. expandability
         g. flexibility
         h. no restrictions of student's functioning in other areas
         i. software support available
         j. academic relevance
         k. external evaluations on device available
         l. compatibility with hardware and software in environment
         m. appropriate and comprehensive documentation
         n. ease of repair
         o. ease of operation

p. compatibility with other adaptive devices student currently uses

2. Manufacturer/vendor
   a. reasonable price for the device
   b. good training and technical support by vendor
   c. loaner/rental available from vendor
      (1) for initial trial period
      (2) when personal device is being repaired
   d. adequate warranty
3. Student
   a. easy to use — minimal operational demands
   b. technology capabilities matches student's needs/abilities
   c. student/parents are satisfied with device
   d. prepares student for future needs
   e. provides multiple uses for student
   f. allows for independent use
   g. cost effectiveness of training
   h. compatible with technology available at home/community

C. Field-test a device
   1. Development of mock-up/prototype
   2. Comparative trials of potential devices
   3. Securing a short-term loan
   4. Use in learning environment
   5. Evaluation of its use in learning environment
   6. Evaluation of its use in other environments
   7. Evaluation of student satisfaction
   8. Selection of the device, a modification of it, or a decision to start over

D. Acquisition of a device
   1. Funding sources
   2. Long-term loan options
   3. Administrative issues

E. Ongoing evaluation of the device
   1. Periodic assessment of use in learning environment
   2. Change in student's skills or needs
   3. Continued use, modification of its use, or selection of a new solution
   4. New technology advances

IV. Training for Technical Operation and Functional Use

A. Identification of training audience
   1. Service providers
      a. teachers
      b. OT/PTs
      c. speech/language clinicians
      d. program assistants
      e. others
   2. Students
   3. Peers

4. Parents

B. Identification of content
   1. Student-specific content
   2. Technology/Device-specific content
   3. Integration of device
   4. Support services

V. Integration into Multiple Environments
   A. Curriculum integration
   B. Integration into the environment
   C. Ability to manage/modify the environment
      1. Modification or change in the environment
      2. Modification or change in the technology alternative
   D. Acceptance/awareness/training
      1. Peers
      2. Students
      3. Teachers
      4. Parents
      5. Others (e.g., office personnel)

VI. Monitoring
   A. Short-term follow-up
   B. Assessment of changing environments and user needs
   C. Establishment of long-term assessment/monitoring plan
   D. Modification or change based on performance
   E. Follow-up training

REFERENCES

NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources.**

Assessment

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Ward, D. E. (1984). *Positioning the handicapped child for function: A guide to evaluate and prescribe equipment for the child with central nervous system dysfunction.*

Selection

Lahm, E., & McGregor, G. (1984). Hardware selection and evaluation. In M. Behrmann (Ed.), *Handbook of Microcomputers in Special Education.*

MODULE 2
READING

Society takes for granted the ability to read, and much information is presented without consideration to those who cannot participate in that task. Even when the target audiences are known to be nonreaders, we forget. From the very beginning of every child's school experience, for example, some information is presented in written form. The preschool teacher creates a bulletin board with words or the coat rack is labeled with the child's name. Even though these may be insignificant items in the overall learning environment, they present barriers to the student who cannot read.

Special education teachers have always had to make adaptations for the student who could not read, but the amount of resources required to adapt all the information available to the reading students is typically not available. Consequently the nonreader loses out.

The student who finds reading a barrier to accessing education may have any number of disabilities. Intellectual development may not have progressed enough to allow the student to perform the component cognitive skills required by the reading task. Or, the student may be cognitively capable but neurological difficulties may interfere with what is seen. Vision deficits may not allow the student to see at all. Or, the student may just be too young and should not be expected to read yet. For whatever the reason, functionally speaking, the student cannot read and some alternative means for sharing written information with that student must be found.

This module examines the student who finds reading a barrier, either completely or partially, in the learning environment. It explores technology solutions that can assist the nonreader in gaining access to written materials. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Developmental age
     2. Chronological age
     3. Cognitive abilities
     4. Visual abilities
     5. Neurological abilities
     6. Language abilities
     7. Native language
   - B. Assessment factors
     1. Barriers to learning
     2. Current capabilities and skills

3. Short-term goals
4. Long-range goals
5. Appropriateness of technology solution
6. Potential solutions/strategies

C. Environmental requirements
1. Written materials
2. Computerized materials

II. Access/Assistance
A. Access to written materials
1. Audio cassette tape recorders
2. Reading services
3. Talking books
4. Bar code readers
5. Text scanners/Optical character readers
6. Use of graphics
a. picture-based materials
b. icon-based materials
c. rebus-based materials
7. Videotape

B. Access to computerized materials
1. Methods which produce speech output
a. speech software using peripheral devices
(1) speech synthesizers
(2) speech digitizers
(3) tape recorders
b. RAM-resident speech software utilizing mother-board-resident speech chip
2. Applications of speech output
a. talking instructional software
b. talking tool software
c. talking books, reference materials
(1) on computer disk
(2) on CD-ROM
d. talking terminal programs
e. talking telecommunications programs
3. Use of graphics
a. picture-based software
b. icon-based software
c. rebus-based software
4. Video-based materials
a. videodisc
b. CD-ROM
c. hypermedia

NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources**.

Access to Written Materials

Larsen, S., & Jorgensen, N. (1989). Talking books for preschool children.

Peli, E., Arend, L. E., Jr., & Timberlake, G. T. (1986). Computerized image enhancement for visually impaired persons: New technology, new possibilities.

VanBiervliet, A. (1984). Enabling handicapped nonreaders to independently obtain information: Initial development of an inexpensive bar code reader system.

Access to Computerized Materials

Dreifuss, S., & Haynes, J. A. (1988). *The development and validation of an expert system knowledge base for primary grade reading interventions.*

Hofmeister, A. M., Engelman, S., & Carnine, D. (1986). Videodisc technology: Providing instructional alternatives.

MODULE 3

SPEAKING

The learning environment traditionally is a social situation where much learning is accomplished through the sharing of information with the teacher and the student's classmates. The majority of this sharing or interaction is verbally transmitted. The student who does not speak or has other problems with spoken communication loses out on the opportunity to be fully interactive in the classroom and use that interaction as a means of learning.

There are a multitude of reasons for a student to have dysfunctional spoken communication skills. Physical disabilities may interfere with the physical production of speech. Language processing disorders or hearing impairments may interfere with putting the necessary language together to communicate a thought. Cognitive abilities may limit the production of meaningful language. Regardless of the underlying disability, the end result is the same. The educational task of spoken communication is a barrier for the student.

This module examines the student who finds spoken communication a barrier, either completely or partially, in the learning environment. It explores technology solutions that can assist the nonspeaker in gaining access to interactive learning opportunities. Components important to the teacher or service provider for training the student to use the technology are also covered.

Note: Frequently the student with difficulties producing spoken communication also has motor disabilities and requires modified or adapted input devices to access the communication devices listed here. For access solutions, refer to Module 4.

I. Analysis
   - A. Student profile
     1. Language abilities
     2. Physical abilities
     3. Cognitive abilities
     4. Hearing abilities
     5. Vision abilities
     6. Speech abilities
   - B. Assessment factors
     1. Language structure
        - a. nonspeaking from birth
        - b. nonspeaking from injury
        - c. degree and onset of language disability
     2. Current skills

a. level of symbolic function (e.g., picture, symbol, word)
b. receptive and expressive abilities
c. form of communication
   (1) gestures/signals
   (2) picture/word/symbol boards
   (3) electronic aids
   (4) spoken; incomprehensible and inconsistent
   (5) spoken; incomprehensible but consistent
   (6) spoken but limited vocabulary
d. interaction skills
   (1) initiating
   (2) responsive
   (3) topic maintenance
   (4) turn taking
e. speed of communication
f. rate of response

3. Input capabilities/method
   a. direct selection/passive display
   b. scanning/active display
   (Input methods and access issues are covered in Module 4)
4. Situational requirements
   a. communication partner/recipient
   b. vocabulary required versus vocabulary available
   c. attitudes of peers and others
   d. environment
5. Appropriateness of technology solution

C. Environmental requirements
   1. Communication of personal needs/choices
   2. Information exchange
   3. Participation in spoken learning activities
   4. Socialization
      a. teacher-student interactions
      b. peer interactions
      c. others

II. Access/Assistance
   A. Manual communication
      1. Gestures
      2. Finger spelling
      3. Sign system
   B. Nonelectric communication aids
      1. Picture boards
      2. Symbol boards
      3. Word boards
   C. Battery-operated electrical aids
      1. Simple linear scanners
      2. Simple rotary scanners
   C. Microprocessor-based dedicated communication devices
      1. Keyboard-like communication devices

a. selection set/representational system
   (1) pictures
   (2) symbols
   (3) alphabet
   (4) words
b. selection method
   (1) direct selection
   (2) scanning
   (3) eyegaze
c. enhancement features
   (1) word prediction
   (2) abbreviation expansion
   (3) Morse code
   (4) level and page nesting
   (5) semantic compaction
d. output modes
   (1) voice
   (2) LCD
   (3) hard copy/print

2. Bar code technology communication devices

D. Multifunction computer-based communication systems
1. General purpose speech output hardware
   a. computers with built-in speech capabilities
   b. firmware
   c. speech synthesizers
   d. speech digitizers
2. Peripheral devices that can function as a communication board
3. Dedicated communication software
4. Memory-resident communication enhancement software
   a. word prediction
   b. abbreviation expansion
   c. Morse code
   d. level and page nesting

E. Alternatives to spoken communication
1. Telecommunications
   a. electronic mail
   b. computer conferencing
   c. on-line course work
   d. TDD/TTY
   e. FAX
2. Written communication
   a. on screen
   b. print/hardcopy

REFERENCES

NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources**.

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MODULE 4

WRITING/MANIPULATING

Similar to verbal communication, written communication is a primary means for interacting with the teacher, classmates, and the learning task. Writing is used to practice mental computations, store thoughts, and illustrate what has been learned. The task of writing is frequently used as the means for learning when the teacher or other classmates cannot verbally interact with the student.

Beyond writing, however, the broader educational task of manipulating materials is closely related. The pencil and paper are just some of the traditional learning materials found in schools. In the early years, beads, blocks, scissors, and glue are primary learning materials and the use of manipulatives occurs throughout the learning environment. Beyond the early childhood years, the use of fine motor skills are also needed to manipulate instructional materials. The high school chemist must be able to mix real chemicals in real test tubes. The ability to perform manipulative tasks, whether for written communication or for discovery, is vital to a successful educational experience.

The student who is barrier-bound when presented with manipulative tasks misses many learning opportunities. Some students may have physical disabilities that prevent the use of the hands or they may have neurological difficulties which disallow the coordination of the hands on manipulative tasks. Student abilities may range from early reaching, touching, and handling of objects to the production of near-legible handwriting. For whatever reason, functionally speaking, these students are nonwriters.

This module examines the student who finds writing or manipulating objects a barrier, either completely or partially, in the learning environment. It explores technology solutions that can assist the nonwriter in gaining access to manipulative learning experiences. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Physical abilities
     2. Neurological abilities
     3. Cognitive abilities
     4. Language abilities
   - B. Assessment factors
     1. The student's physical capabilities
        a. consistency and control of movements

b. range of motion
c. strength
d. dexterity
e. accuracy of action
f. resolution
g. endurance

2. Current strategies
   a. positioning
   b. adapted materials
3. Current writing/manipulating skills
4. Speed and functionality of skills
5. Appropriateness of technology solution

C. Environmental requirements
1. Learning tasks that require manipulation skills
2. Learning tasks that require writing skills

II. Access/Assistance

A. Assistance with the task of manipulation
1. Adapted toys
2. Robotics
3. Environmental controls
4. Simulations

B. Assistance in production of written work
1. Noncomputer solutions
   a. dictation machines
   b. voice-activated tape recorders
   c. typewriter
2. Computer-based solutions
   a. expansion/acceleration enhancement features
      (1) assisted keyboarding
      (2) word prediction
      (3) abbreviation expansion
      (4) semantic compaction
      (5) level and page nesting
      (6) Morse code
   b. word processors
   c. information organizers/databases

C. Access to the computer: Simple modification strategies
1. Keyboard adaptations
   a. support bars or wrist rests
   b. hand and head prostheses
   c. slant boards
   d. keyguards and covers
   e. keylocks
   f. masks
   g. repeat key defeats
   h. latch keys
   i. other
2. Environment adaptations

a. rearrangement of the individual components of a computer system
b. repositioning of the student
c. portable writing devices

D. Access to the computer: Alternative input
1. Detachable keyboards
a. keyboards with long cords
b. keyboards easily moved
c. keyboards placed on wheelchairs or student's lap
d. remote control interfaces
2. Keyboard emulators
a. nonstandard keyboards that emulate the standard keyboard while directly connected to the computer
b. interface cards that accept nonstandard keyboard input and emulate the standard keyboard for the computer
3. Customizable keyboards that do not require an emulator interface but require specialty software
a. software redefinition of standard keyboard
b. reconfigured programmable keyboards
(1) oversized keyboards
(2) mini keyboards
(3) membrane keyboards
4. Customizable keyboards that require keyboard emulators
a. keyboard configuration
(1) expanded keyboards
(2) mini keyboards
(3) membrane keyboards
(4) keyboards for one-handed typists
b. selection method
(1) direct selection
(2) scanning
5. Nonkeyboard solutions
a. voice recognition
b. switches and switch interfaces
c. mouse/trackball
d. joystick/paddles
e. eye gaze technology
f. light beam
g. ultrasonic pointing system
h. infrared pointing system
i. touch sensitive devices

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MODULE 5

SEEING/VISUAL PROCESSING

So much of the learning environment is visual information. Teachers use chalkboards, information is presented in textbooks, and computer-assisted instructional software uses animated graphics. The student with visual disabilities is surrounded by barriers to learning. This student may have a physical sensory deficit or may have difficulties processing visual information. Regardless of the origin or severity of the disability, in the classroom this student cannot benefit from information presented visually.

This module examines the student who finds visually presented information a barrier, either completely or partially, in the learning environment. It explores technology solutions that can assist the visually impaired person in gaining access to visual materials. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Vision abilities
     2. Neurological abilities
     3. Physical abilities
   - B. Assessment factors
     1. Lighting considerations
     2. Physical sensory deficits
        - a. visual acuity
        - b. visual field
        - c. functional color vision
     3. Difficulties processing information
     4. Physical environment
     5. Appropriateness of technology use
   - C. Environmental requirements
     1. Collection and storage of information for personal use
     2. Access to visual materials and resources
     3. Production of visual materials

II. Access/Assistance
   - A. Assistance in the collection and storage of information for personal use
     1. Slate and stylus for braille
     2. Tape recorders with indexing capabilities
     3. Braillers

4. Refreshable braille
5. Portable braille note taking devices
6. Talking calculators
7. Voice input with appropriate speech synthesis and screen reading programs
8. Tool/utility software
   a. word processors
   b. auditory information organizers/databases
   c. expansion/acceleration features
      (1) assisted keyboarding
      (2) word prediction
      (3) abbreviation expansion
      (4) encoding
      (5) levels and pages
      (6) Morse code
9. Text to braille conversion software

B. Access to visual information
   1. Human assistants
      a. private readers
      b. reading services
   2. Large print books/materials
   3. Braille books/materials
   4. Talking books (tapes or records)
   5. Text enlargers
      a. low vision aids
      b. magnifiers
      c. graphics enlargers
      d. closed circuit television
      e. large print display interfaces for computers
      f. oversized screens/monitors/televisions
   6. Tactile text
      a. text to braille converters
      b. braille production
         (1) brailler
         (2) embosser
         (3) refreshable
      c. raised/vibrating text
   7. Speech output
      a. specialty software
         (1) talking instructional software
         (2) talking tool software
         (3) talking books, reference materials
         (4) voice-based telecommunications
      b. utility software
         (1) RAM-resident speech utility
         (2) talking terminal programs
         (3) text scanners to speech
      c. hardware alternatives for speech output (e.g., Speaqualizer)
      d. barcode readers

8. Computerized books
9. Optical character readers

C. Assistance in production of visual material
1. Braille to text converters
2. Screen to text converters
3. Large print software programs

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NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources.**

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MODULE 6

HEARING/LISTENING

The auditory mode of information transfer is seldom the sole mode used in the learning environment but is a major secondary means when presenting information to students. Movies have sound tracks, teachers talk as they demonstrate, and music accompanies rhythmic movement exercises. While many of these methods of teaching have been adapted for the learner with hearing disabilities, without access to spoken information, the student is less likely to be a successful learner.

As stated earlier, the learning environment is a social environment. Like the student who cannot verbally interact with the teacher and classmates, the student who cannot auditorily participate is at a similar disadvantage. Ranging from mild to profound hearing loss or auditory processing difficulties, these students not only receive less information, but are frequently hampered in the way they acquire and use language. They often do not have ample opportunities to practice language naturally. As a result, they often have poor language and reading skills. These, in turn, have a secondary impact on cognition.

This module examines the student who finds auditory presented information a barrier, either completely or partially, in the learning environment. It explores technology solutions that can assist the hearing impaired person in gaining access to auditory information. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Physical abilities
     2. Auditory processing abilities
   - B. Assessment factors
     1. Hearing
        - a. level of loss
          - (1) aided
          - (2) unaided
        - b. age at onset of loss
        - c. auditory processing difficulties
        - d. type of loss
     2. Receptive communication
        - a. speech reading without sound
        - b. speech reading with sound
        - c. signed communication

3. Vision
   a. visual acuity
   b. visual field
   c. color blindness
4. Expressive communication
   a. intelligibility
   b. spontaneous word intelligibility
   c. signing ability
5. Current language level
6. Current reading level
7. Current writing level
8. Current communication mode
9. Appropriateness of technology solution

C. Environmental requirements
   1. Access to auditory information
   2. Communication
   3. Daily living tasks

II. Access/Assistance
   A. Access to auditory information
      1. Human assistants
         a. interpreters
         b. tutors/notetakers
      2. Amplified hearing devices
         a. hearing aids
         b. FM loops
         c. computerized hearing aids
         d. auditory trainers
      3. Telecommunications
      4. Captioning
         a. closed or open captioning
         b. real-time captioning
         c. signed programming
         d. dedicated television networks
         e. captioned interactive videodisc
      5. Vibrotactile aids
   B. Assistance with communication and language
      1. Aids for collecting and storing information for personal use
         a. projection techniques for notetaking
         b. writing aids
      2. Receptive communication
         a. lip reading
            (1) visual codes
            (2) real-time extraction of specific features from speech
         b. signing
         c. human assistants
         d. auditory materials converted to print, e.g., on-line instruction
      3. Expressive communication
         a. human assistants

(1) signing interpreters
(2) oral interpreters
b. note writing
c. telecommunications
d. synthesized speech
e. tool software for grammar and spelling
f. software to assist articulation development

C. Daily living aids
1. Alternative telephone systems
a. non-computer-based system
(1) telephone relay service
(2) TDD, TTY
(3) touch-tone decoders
(4) facsimile/Fax systems
(5) video telephone
b. computer-based systems
(1) electronic mail
(2) computer conferencing
2. Combination technology
a. videotex
b. telephone communication via speech recognition
3. Signal systems
a. light
b. vibrator
c. chip based (digital signaling)
d. satellite-based
4. Transmission mechanisms
a. hard wiring
b. radio-frequency signals
c. line power

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MODULE 7

COGNITIVE PROCESSING

The development of the cognitive capabilities is one of the primary goals of education. The educational task of cognitive processing, in its many forms, consumes the majority of the school day. The student who finds these tasks a barrier is likely to be unsuccessful without some additional assistance.

The student who has difficulty performing cognitive tasks could have any of a number of disabilities. The major disabling condition is mental retardation with its range from very severe to mild retardation. Brain injuries and other perceptual, neurological, and language disorders could account for cognitive difficulties as well. Regardless of the origin, the teacher sees the same result—the student cannot perform the requested task.

This module examines the student who finds cognitive tasks a barrier, to varying degrees, in the learning environment. It explores technology solutions that can assist the cognitively impaired person in gaining access to instructional materials. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Cognitive abilities
        - a. mildly limited
        - b. moderately limited
        - c. severely limited
     2. Perceptual/neurological abilities
     3. Language abilities
     4. Degree and type of brain injury
     5. Attending skills
   - B. Assessment factors
     1. Cognitive range
     2. Academic skills
     3. Motor skills
     4. Communication skills
     5. Motivation
     6. Secondary disabilities
     7. Appropriateness of technology solution
     8. Auditory and visual perception abilities
   - C. Environmental requirements
     1. Access to information
        - a. written information
        - b. spoken information

2. Learning/cognitive tasks
   a. memory
   b. motor
   c. attention
   d. problem solving
   e. choice making
   f. comprehension
   g. skill integration
3. Vocational tasks
4. Daily living tasks

II. Access/Assistance
   A. Access to written information
      1. Speech synthesizers
         a. talking instructional software
         b. talking tool software
      2. Graphics
         a. picture-based software
         b. icon-based software
      3. Combination technologies
         a. scanner
         b. bar code technology
         c. hypermedia
   B. Access to spoken information
      1. Sign/gestures
      2. Digitized versus synthesized speech
   C. Access to learning/cognitive tasks
      1. Switch training to access learning systems
      2. Motor training
         a. postural
         b. perceptual motor
      3. Software solutions
         a. cognitive training programs
         b. simulations
         c. memory assistance
            (1) memory training software
            (2) memory aids
            (3) expert systems
         d. problem solving
         e. computer-assisted instruction (CAI)
         f. intelligent CAI
   D. Aids for vocational tasks
      1. Simulations
      2. Videotape/videodisc
      3. Handheld electronic devices (e.g., talking calculators, calendars)

E. Aids for daily living tasks
   1. Environmental controls; use Module 4
   2. Communication devices and programs; use Module 3
   3. Signal systems; use Module 6
   4. Memory aids

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MODULE 8

MULTIPLE DISABILITIES

Seldom does a student encounter a barrier in one educational task alone. The student who has problems reading may well have cognitive processing problems too. For the individual who finds barriers in manipulative tasks, reading and speaking may also be barriers. The degree to which a given task is a barrier will differ for each individual. In arriving at a technology solution for an individual, it is important to identify all potential barriers for the individual and become aware of how they interact and affect the learner. It is rare that a second disability is a simple addition of a second set of limitations. Each additional disability, more often, has a multiplicative nature on the abilities of the individual. Consequently, solutions are not arrived at by examining each disability or barrier alone.

This module examines the student who finds more than one educational task to be a barrier in the learning environment. It explores technology solutions that address multiple needs and assist in gaining access to the learning environment. Components important to the teacher or service provider for training the student to use the technology are also covered.

I. Analysis
   - A. Student profile
     1. Individual disabilities
     2. Multiplicative nature of multiple disabilities
   - B. Assessment factors
     1. Unique needs
        - a. physical ability
        - b. cognitive ability
        - c. sensory abilities
        - d. communication abilities
     2. Multiplicative impact of the disabilities
     3. Appropriateness of technology solution
   - C. Environmental requirements
     1. Access to instruction
        - a. access to written material/information
        - b. access to learning that requires writing/manipulating
        - c. access to visual information
        - d. access to auditory information
     2. Performance of basic living skills/functional skills
        - a. spoken and written communication
        - b. collection and storage of information for personal use
        - c. daily living tasks

3. Integration of performance and access skills
4. Vocational skills
5. Recreational/leisure activities
6. Social skills

II. Access/Assistance
   A. Access to instruction
      1. For written material/information, use Module 2
      2. For writing/manipulating, use Module 4
      3. For seeing/visual processing, use Module 5
      4. For hearing/listening, use Module 6
      5. For cognitive processing, use Module 7
   B. Assistance with basic living skills/functional skills
      1. Alternative means of communicating, use Modules 3 and 4
      2. Assistance in the collection and storage of information for personal use, use Modules 5 and 6
      3. Assistance with daily living aids, use Modules 6 and 7
   C. Assistance with vocational skills, use Module 7
   D. Assistance with recreational/leisure activities, use Modules 4 and 7

Sample Case

Student Profile: An adolescent male with a primary disability of cerebral palsy. Secondary or coincidental disabilities include perceptual/neurological impairments and a vision loss.

Environments: Mainstream middle school classrooms: resource room

Assessment Factors:
Reading: below grade level primarily due to vision loss
Spoken communication: unintelligible speech; has a yes/no communication response system
Writing: nonfunctional due to motor abilities of upper extremity
Visual processing: has difficulty with standard print
Hearing/listening: no problems
Cognitive: below grade level but no apparent retardation
Needs/goals: communication with peers/teachers; participation in mainstream instruction

Access/Assistance:
Module 2—applications of speech output
Module 3—multifunction computer-based communication system
Module 4—accessing the computer with an alternative input
Module 5—access to visual information; text enlargers, speech output
Module 7—access to written and spoken information

NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources.**

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General

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MODULE 9

IMPLEMENTATION AND RELATED ISSUES

Successful use of technology is not ensured by proper selection alone. Successful implementation includes training, integration, and monitoring. Training provides all people responsible for the implementation of the technology with knowledge on the operation and functional application of the selected devices. Integration of the technology goes beyond skill training to ensuring the device's use in multiple circumstances. A trained student may know how to operate a device with excellent proficiency but if it cannot be used in multiple situations and with the multiple tasks presented daily in the classroom, the device may not be the best solution. These multiple situations also include many classmates and adults. Acceptance of the assistive technology solution by these individuals is also critical to successful use.

The educational environment and the student's relationship to it are dynamic. New skills allow the student to interact with the educational tasks in a different way. Consequently the student's needs are constantly changing. Periodic monitoring and planning are critical to the successful use of assistive technologies. This module highlights training, integration, and monitoring. They are covered together in this last module because they are key to all applications of assistive technology and are not specific to one functional task.

I. Training
   - A. Identification of audience
     1. Service providers
        - a. teachers
        - b. occupational therapists/physical therapists
        - c. speech/language clinicians
        - d. community
        - e. administrators/others
     2. Student/user
     3. Peers
     4. Parents/Guardians
   - B. Assessment of audiences' potential, skills, comfort, and attitude toward the technology
   - C. Identification of content
     1. Student-specific content
        - a. preskill training
        - b. operation
        - c. skill training

d. programming
e. trouble-shooting
f. maintenance
g. training for independent use
h. early training for future technology use
i. attitude adjustment

2. Caregiver training for specific technology/device
   a. operation/interface concerns
   b. set up and customizing
   c. trouble-shooting
   d. maintenance
   e. security of technology
   f. programming/customizing
   g. adding graphics
   h. adding voice
   i. attitude adjustment
3. Integration of device
   a. knowledge of broad application
   b. curriculum integration
   c. integration into environment
4. Support services
   a. user groups
   b. support groups
   c. funding sources
   d. technical support

D. Long-term and follow-up training

II. Technology Integration

A. Curricular areas for integration
   1. Academics
   2. Self-esteem
   3. Social interaction
   4. Prosthesis/access
   5. Vocational skills
   6. Recreational skills
   7. Daily living skills

B. Integration into the environment
   1. Mainstream settings
   2. Self-contained classrooms
   3. Recreational/social settings
   4. Vocational/work settings
   5. Home setting

C. Use in environment
   1. Modification or change in the environment
      a. learning environment
      b. materials
      c. instructional techniques
      d. curriculum
      e. incentives

2. Modification or change of the technology alternatives
   a. modification of current technology
   b. updating to current technology
   c. selection of new technology alternative

D. Acceptance by teachers, parents, peers, student, and others
   1. Best practices
   2. Quality indicators

III. Monitoring
   A. Change in student's needs/abilities and goals
   B. Change in physical environment
   C. Development of a 5-year plan
   D. Long-term planning
   E. Change in student's learning requirements
   F. Changes in technology
   G. User satisfaction

IV. Issues
   A. Funding
      1. Ownership
      2. Home use
      3. Repairs/maintenance
      4. Coordination
      5. Leasing
      6. Updating
   B. Administrative acceptance/support
      1. Funding
      2. Training
      3. Release time
   C. Inclusion of technology in the IEP
   D. Legal ramifications
   E. Ethics and equity
      1. Qualifications of the assessor
      2. Home use
      3. Ownership
      4. Resource distribution
   F. Availability of future devices that meet student's changing needs and skills

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NOTE: The following citations have been purposely shortened. Complete citations are included in **Part 3: References and Resources.**

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PART 3

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References and resources are briefly cited in the training modules. This section provides the full citation for all the references and resources mentioned in the modules.

Please note: This listing is not inclusive. Readers are urged to contribute by suggesting other training resources and references to be added to this part.

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Access Unlimited. (Producer). (n.d.). *We have something to say* [Videotape]. Houston, TX: Access Unlimited.

This video shows over 25 children with special challenges at seven different sites working spontaneously in a variety of educational settings with adapted computer devices and software used with Apple computers. The youth range in age from 7 months through 22 years. All are experiencing physical or cognitive barriers to learning, and are interacting with readily available

special computer options. Time: 14 minutes. Cost: $48.50, also available on loan. Available from:

Access Unlimited
P.O. Box 7986
Houston, TX 77270
713/461-0006

American Speech-Language-Hearing Association. (Producer). (1989). *An overview of microcomputer applications* [Software]. Rockville, MD: American Speech-Language-Hearing Association.

This module takes the novice computer user through a range of areas of computer awareness and applications: the components of a microcomputer, how to assemble a computer system and perform simple operations, general principles for using computers for assessment, intervention, administrative functions, and how to screen software prior to purchasing. Cost: $45. Available from:

ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700

American Speech-Language-Hearing Association. (Producer). (1989). *Microcomputer applications for audiologists* [Software]. Rockville, MD: American Speech-Language-Hearing Association.

This module illustrates assessment and rehabilitative uses for professionals working with hearing impaired individuals. Demonstrations show computer use in pure tone, speech, and special testing, and computer-assisted hearing aid fitting. Cost: $45. Available from:

ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700

American Speech-Language-Hearing Association. (Producer). (1989). *Microcomputer applications in assessment* [Software]. Rockville, MD: American Speech-Language-Hearing Association.

This module describes how computers can assist in evaluating communication disorders. The package explains assessment functions and methods for conducting diagnostic procedures. It also includes demonstration programs. Cost: $45. Available from:

ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700

American Speech-Language-Hearing Association. (Producer). (1989). *Microcomputer assisted intervention* [Software]. Rockville, MD: American Speech-Language-Hearing Association.

This module takes the speech-language-hearing professional through the steps of integrating microcomputers into the client intervention process. The package presents a wide range of treatment applications, illustrates types of available software, and provides demonstration programs for getting "hands-on" experience. Cost: $65. Available from:

ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700

American Speech-Language-Hearing Association. (Producer). (1986). *Talk is not a four-letter word* [Videotape]. Rockville, MD: American Speech-Language-Hearing Association.

This tape is designed for graduate-level introductory-level courses in augmentative communication. It shows the incorporation of various augmentative communication devices in a "total communication" approach to speech/language therapy for individuals with severe expressive communication disorders. It demonstrates the use of portable electronic devices as well as manual communication aids, Blissymbols, and sign language. Time: 16 minutes. Cost: $15.00. Available from:

ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700

Apple Computer. (Producer). (1989). *Access* [Videotape]. Cupertino, CA: Apple Computer.

This videotape provides general awareness of the life changing potential for technology. It includes examples of technology used by persons with disabilities. Available free from:

Office of Special Education and Rehabilitation
Apple Computer
20525 Mariani Avenue
Cupertino, CA 95014

ARC of the United States. (Producer). (1990). *A new horizon* [Videotape]. Arlington, TX: Author.

This tape is a documentary demonstrating the application of assistive technology using voice recognition to persons who are severely mentally retarded and severely physically involved. Available from:

ARC of the United States
2501 Avenue J
Arlington, TX 76006
817/640-0204

ARC of the United States. (Producer). (1990). *Eye on the horizon* [Videotape]. Arlington, TX: Author.

This tape is a documentary demonstrating the application of eyegaze technology to children who are severely disabled. Available from:

ARC of the United States
2501 Avenue J
Arlington, TX 76006
817/640-0204

California State University, Northridge. (Producer). (1990). *Job development through technology* [Videotape]. Northridge, CA: Author.

This videotape presents individuals with various disabilities who are currently employed. In addition, students seeking employment with the assistance of technology are presented. Available from:

Offices of Disabled Student Services
California State University, Northridge
18111 Nordhoff Avenue
Northridge, CA 91330
818/885-2684

CMECSU (1988). *Technology-assisted contingency training: Assessment, program planning, progress monitoring for individuals utilizing simple technology* (Printed Manual). St. Cloud, MN: Central Minnesota ECSU Technology Project.

This manual provides extensive background, assessment, program planning, and progress monitoring information for individuals utilizing simple technology to achieve functional goals and objectives. Cost $27. Available from:

Central Minnesota ECSU Technology Project
3337 W. St. Germain, Suite 105
St. Cloud, MN 56301
612/255-4913

CMECSU (Producer). (1988). *Simple technology: Tools for independence video* [Videotape]. St. Cloud, MN: Central Minnesota ECSU Technology Project.

This introductory tape accompanies the technology-assisted contingency training materials as a visual guide to appropriate applications of switch access devices within a functional curriculum. Cost $27. Available from:

Central Minnesota ECSU Technology Project
3337 W. St. Germain, Suite 105
St. Cloud, MN 56301
612/255-4913

COMPUTE. (n.d.). *Adaptive devices.* (Training Module). Wayne, MI: COMPUTE.

This workshop introduces participants to a variety of adaptive devices for microcomputers. Uses of these devices in the areas of communication, movement, and instruction are demonstrated. The training includes brief descriptions of the types of problems students have and how they can be addressed by existing microcomputer applications and adaptive devices. The module also demonstrates several devices and adaptations in use as well as briefly discussing alternatives to the items shown and their uses in the "real world." This training module is available only through a COMPUTE trainer. Available from:

COMPUTE (Coalition of Organizations in Michigan
to Promote the Use of Technology in Special Education)
Wayne County ISD
33500 Van Born Road
Wayne, MI 48184
313/467-1439

COMPUTE. (n.d.). *Evaluation.* (Training Module). Wayne, MI: COMPUTE.

This workshop presents knowledge and skills necessary to perform a systematic evaluation of equipment, peripheral devices, and software for decision making prior to purchasing. Emphasis is on practical considerations and understanding the market so that the greatest usefulness for district resources may be achieved. This training module is available only through a COMPUTE trainer. Available from:

COMPUTE (Coalition of Organizations in Michigan
to Promote the Use of Technology in Special Education)
Wayne County ISD
33500 Van Born Road
Wayne, MI 48184
313/467-1439

Education TURNKEY Systems. (1990). *Aids and devices to enhance employability* [Videotape]. Falls Church, VA: Author.

On June 7, 1990, Education TURNKEY transmitted a video teleconference on aids and devices that enhance job separation and employability of disabled individuals. The program included: summary presentations on the various types of devices; prerecorded video presentations on selected devices; a panel discussion by rehabilitation and special education experts about devices, funding opportunities, and the array of support and referral resources

available; and live interaction involving individuals at both the host site and participating public television situations. The tape is approximately 2-1/2 hours, VHS format. Cost: $20. Available from:

Education TURNKEY Systems
256 North Washington Street
Falls Church, VA 22046
703/536-2310

Education TURNKEY Systems. (1990). *Communication aids for cognitively-impaired children* [Videotape]. Falls Church, VA: Author.

On May 10, 1990, Education TURNKEY transmitted a video teleconference on communication aids and software for cognitively impaired children. The program included: summary presentations on the various types of software; prerecorded video presentations on selected devices; a panel discussion about funding opportunities, and the array of support and referral resources available; and live interaction involving individuals at both the host site and participating public television situations. The program was intended to acquaint audiences with new and emerging communication technologies and to explore issues related to technology use. The tape is approximately 2-1/2 hours, VHS format. Cost: $20. Available from:

Education TURNKEY Systems
256 North Washington Street
Falls Church, VA 22046
703/536-2310

Education TURNKEY Systems. (1989). *April 27 video teleconference on communication aids and devices* [Videotape]. Falls Church, VA: Author.

On April 27, 1989, Education TURNKEY transmitted a video teleconference on communication aids and devices. The program included interviews with legislators and leaders in the technology field. The program was intended to acquaint audiences with new and emerging communication technologies and to explore issues related to technology use. An additional tape, entitled "May 31 Training Tape," contains several 20-minute segments on how to fit and install some of these communication devices. Both tapes are approximately 2-1/2 hours each, VHS format. Cost for each videotape: $20. Available from:

Education TURNKEY Systems
256 North Washington Street
Falls Church, VA 22046
703/536-2310

FDLRS/TECH & FDLRS/Reach. (1989). *Technology for little people.* (Printed Materials). Merritt Island, FL: FDLRS Network.

This training guide is divided into four sections. Included are: the role of technology in the preschool curriculum, prerequisites for computer use by children with various handicaps, appropriate hardware and computer-re-

lated materials for preschoolers with handicaps, and how to design the learning environment for computers. Each section contains objectives, suggested presentation time, materials, tips to the trainer, procedures, and resources. Transparency masters and handouts are also included. Available from:

FDLRS/TECH
1450 Martin Boulevard
Merritt Island, FL 32952
305/631-1911

Georgia Learning Resource System. (Producer). (n.d.). *Adaptive devices from least restrictive to most restrictive* [Videotape]. Augusta, GA: East Georgia Learning Resource System.

This videotape provides a review of adaptive devices for computers, including keyboard modifications, adapted keyboards, and switches. Available from:

Joan Basile
East Georgia Learning Resource System
3108 Lake Forest Drive
Augusta, GA 30909
404/731-8777

Hutinger, P. (1986). *The ACTT starter kit.* (Training guide). Macomb, IL: Macomb Projects, Western Illinois University.

The Activating Children Through Technology (ACTT) Starter Kit contains information that will enable educators to utilize computer technology with young handicapped children ages birth through 8. The Kit addresses the philosophy of computer use, practical system set-up, and design principles. The Kit is divided into six major areas: "Introduction," "Getting Started," "Equipment," "Software," "Curriculum Application," and "LOGO. Cost: $40.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Los Angeles Unified School District and the UCLA Intervention Program. (1989). *Computer use for young special needs children: An instructional guide for families and professionals.* (Printed Manual). Los Angeles, CA: Author.

This manual lists software and devices appropriate for the young child. Available from:

UCLA Intervention Program for Handicapped Children
1000 Veteran Avenue
23-10 Rehabilitation Center
Los Angeles, CA 90024
213/825-4821

Microcomputer Applications Project. (Producer). (1989). *Advanced circuitry* [Videotape]. Macomb, IL: Western Illinois University.

This videotape provides detailed instructions for construction of an input pigtail and an external connector for the Apple Speaker jack and presents procedures for disabling the auto-repeat function of the Apple IIe. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project. (Producer). (1989). *Alternative input and output* [Videotape]. Macomb, IL: Western Illinois University.

This videotape demonstrates input and output devices which may be used with children with severe disabilities. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project (Producer). (1989). *Alternative input: Hardware and software* [Videotape]. Macomb, IL: Western Illinois University.

This videotape addresses techniques to modify input using devices such as the Adaptive Firmware Card and the Unicorn Membrane Keyboard. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project. (Producer). (1989). *Benefits and applications of computer technology for children with severe disabilities* [Videotape]. Macomb, IL: Western Illinois University.

This videotape discusses the philosophy behind and benefits of microcomputer use with children with severe disabilities. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project (Producer). (1989). *Benefits and applications of computer technology for infants and toddlers* [Videotape]. Macomb, IL: Western Illinois University.

This videotape discusses the philosophy behind and benefits of microcomputer use with infants and toddlers with disabilities and illustrates applications in early intervention programs. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project. (Producer). (1989). *Computer use: An introduction* [Videotape]. Macomb, IL: Western Illinois University.

This videotape is designed to help familiarize training participants with the essentials of Apple IIe computer set-up and operation. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project. (Producer). (1989). *Constructing a battery interrupter and tread switch* [Videotape]. Macomb, IL: Western Illinois University.

This videotape provides detailed instructions for making two simple devices and techniques for acquiring simple circuitry skills. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Microcomputer Applications Project (Producer). (1989). *Using computers as tools for communication* [Videotape]. Macomb, IL: Western Illinois University.

This videotape discusses the philosophy and applied techniques for using communication programs with children with severe disabilities. Cost: $45.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Mistrett, S. G., & Raimondi, S. L. (1989). *Special friends and computers: Adapting the computer* [Videotape]. Buffalo, NY: UCPA of Western New York.

This 15-minute videotape introduces ways that the computer can be adapted for use with preschoolers. The videotape comes with a manual. Cost: $30.00. Available from:

UCPA of Western New York
Children's Services Division
4635 Union Road
Buffalo, NY 14225
717/633-4444

National Lekotek Center. (Producer). (1990). *Opening closed doors: Implementing computers into the special education curriculum* [Videotape]. Evanston, IL: National Lekotek Center.

A discussion and demonstration of effective computer use for children with special needs. Children with various disabilities are depicted using computers in various settings. Available from:

National Lekotek Center
100 Ridge Avenue
Evanston, IL 60201
708/328-0001

National Lekotek Center. (1990). *Using computers to teach children with special needs: A guidebook of effective computer strategies* (Training manual). Evanston, IL: Author.

The guide provides an overview and discussion of the theoretical framework for using computers with children with disabilities. It also discusses practical applications for integrating computers into the special education curriculum and offers a look at the future for using computer technology with children who have special needs. Available from:

National Lekotek Center
2100 Ridge Avenue
Evanston, IL 60201
708/328-0001

Pennsylvania Assistive Device Center (Producer). (1986). *ACS SpeechPAC/EvalPAC* [Videotape]. Harrisburg, PA: Author.

Dave Gordon, inventor of the SpeechPAC, explains this system and its operation and also that of the ACS EvalPAC. The person using either device can type a message and the system will speak or print. The process of logical letter coding is described and demonstrated. This can be used as both an evaluation aid and a training aid. Time: 47 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1986). *Adaptive Firmware Card for the Apple IIe* [Videotape]. Harrisburg, PA: Author.

This video demonstrates all of the steps in installing an Adaptive Firmware Card. All of the components of the AFC and the Apple IIe computer are discussed and demonstrated. An input/output box is installed and the firmware card is put in place. After the card is installed, it is initialized and different switches are discussed and demonstrated. Demonstration programs are used to show the capabilities of the Adaptive Firmware Card. Time: 80 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1988). *Adaptive Firmware Card for the Apple IIgs* [Videotape]. Harrisburg, PA: Author.

This video offers the same help with installing an Adaptive Firmware Card as the video on the IIe (above). Time: 60 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1987). *Evaluation and assessment of students with augmentative communication needs.* [Videotape]. Harrisburg, PA: Author.

This video follows three children through the assessment and evaluation process to determine what types of electronic augmentative communication systems would be helpful for them. The importance of interdisciplinary techniques is emphasized. The most appropriate assessment occurs when local therapists and teachers work with the child in his or her natural environment. Time: 70 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1987). *Eye gaze communication.* [Videotape]. Harrisburg, PA: Author.

Sharon Crain, author and augmentative communication specialist, and Tilden Bennett of Sentient Systems provide an overview of manual as well as electronic eye gaze communication techniques. Information about commercially available eye gaze communication boards and homemade boards is also included. Tilden Bennett, developer of the EyeTyper, demonstrates his device and provides a unique historical perspective on the development and refinement of it. Time: 25 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1989). *Implementing technology with students with augmentative communication needs.* [Videotape]. Harrisburg, PA: Author.

Seven Pennsylvania students are featured in their educational environments successfully using their augmentative communication systems. Their parents, teachers, therapists, and administrators share honest opinions on the process of integration of the technology into these environments as well as their feelings about the technology itself. Appropriate implementation strategies are discussed and described. Time: 70 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center (Producer). (1986). *Prentke Romich Touch Talker and Light Talker with Minspeak* [Videotape]. Harrisburg, PA: Author.

The purpose of this tape is to familiarize people with the Touch Talker and Light Talker communication aids. The tape covers the identification of components and simple operating concepts of the Minspeak system. Bruce Baker, inventor of Minspeak, describes the components of the system and how to use it. Parts 1 and 2: 45 minutes, Parts 3 and 4: 60 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

Pennsylvania Assistive Device Center. (Producer). (1987). *Scanning: The view from Zygo and Zygo Notebook and Lightwriter* [Videotape]. Harrisburg, PA: Author.

Larry Weiss, president of Zygo Industries, explains the Zygo Notebook and the Lightwriter to special education teacher Robin Brown. A student with cerebral palsy demonstrates their use. The Lightwriter is a portable face-to-face communication system and is intended for conversation and socialization. The Zygo Notebook is a full text editor with note taking and report writing abilities. Time: 25 minutes. Cost: $15.00. Available from:

Pennsylvania Assistive Device Center
150 South Progress Avenue
Harrisburg, PA 17109
717/657-5840

San Diego State University. (n.d.). *I can do that* [Videotape]. San Diego, CA: Author.

This videotape explores the promise of technology for handicapped learners and ways in which school programs have made that promise a reality. Cost $15.00. Available from:

Department of Education
State Study of Special Education Technology
San Diego State University
San Diego, CA 92182
619/265-6665

University of Kansas (Producer), & Crabtree, J. (Director). (1987). *Equal opportunity at the keyboard* [Videotape]. Houston, TX: Access Unlimited-SPEECH Enterprises.

This 10-minute videotape features the adaptive firmware card, the unicorn expanded keyboard, scanning options, and special switches. The tape demonstrates computers in use by severely handicapped children and young

adults and shows how they can run standard and modified software using these various devices. Cost: $45 plus shipping and handling. Available from:

Access Unlimited—SPEECH Enterprises
9039 Katy Freeway, Suite 414
Houston, TX 77024
713/461-0006

For additional training materials: Contact individual device manufacturers and software producers regarding availability of vendor-produced training materials.

SELECTED CURRICULA

Bowser, G. (1989). *Computers in the early intervention curriculum.* Roseburg, OR: Oregon Technology Access Project.

This introductory handbook describes uses of computers for young children with disabilities. Developed by the staff of the Oregon Technology Access Project, the manual provides numerous examples and suggestions on the ways children can benefit from the use of computers. Cost $1.50. Available from:

Oregon Technology Access Project
1871 NE Stephens
Roseburg, OR 97470
503/440-4791

Bowser, G. (1989). *Computers in the special education curriculum.* Roseburg, OR: Oregon Technology Access Project.

This 30-page manual describes how to use computers in the special education classroom. Divided into several sections, it includes information on planning for learning, planning for access, and how to address goals. Goals for communication, recreation, creativity, social and interaction, environmental control, mobility, perception, and prevocation are discussed. For each goal a sample goal and methods and materials are listed. Cost: $1.50. Available from:

Oregon Technology Access Project
1871 NE Stephens
Roseburg, OR 97470
503/440-4791

California State University, Northridge. (1990). *Job development through technology.* Northridge, CA: Author.

This curriculum manual includes technology applications for the blind and visually impaired, the physically challenged, communication impaired, deaf and hearing impaired, learning disabled, and cognitively impaired. It also features resource sections on funding sources, federal legislation, state protection and advocacy agencies in Region IX, associations for specific disabilities, and product and manufacturers of adaptive devices. Available from:

Offices of Disabled Student Services
California State University, Northridge
18111 Nordhoff Avenue
Northridge, CA 91330
818/885-2684

Dell, A. G. (1988). *Access to computers: A training module.* Trenton, NJ: Trenton State College.

Trenton State is infusing technology into undergraduate college courses in special education. This module addresses simple assistive devices and adaptive inputs and outputs, such as speech synthesizers and large print displays. Cost: $5. Available from:

Trenton State College
The Department of Special Education
Hillwood Lakes, CN 4700
Trenton, NJ 08650-4700
609/771-2308

Dell, A. G. (1988). *Adaptive switches: A training module.* Trenton, NJ: Trenton State College.

This module is designed for infusion into an undergraduate college course in special education. The training module focuses on using a variety of switches to adapt toys and devices. Cost: $5. Available from:

Trenton State College
The Department of Special Education
Hillwood Lakes, CN 4700
Trenton, NJ 08650-4700
609/771-2308

Dell, A. G. (1988). *Augmentative communication: A training module.* Trenton, NJ: Trenton State College.

This module is designed for infusion into an undergraduate college course in special education. It presents the advantages of using electronic augmentative/alternative communication systems and demonstrates several communication aids. Cost: $5. Available from:

Trenton State College
The Department of Special Education
Hillwood Lakes, CN 4700

Trenton, NJ 08650-4700
609/771-2308

Hutinger, P. (1986). *ACTT curriculum.* Macomb, IL: Macomb Projects, Western Illinois University.

Activating Children Through Technology (ACTT) curriculum is a supplemental curriculum designed to be used in conjunction with the educator's existing specialized computer programs for children ages birth through 8. There are three primary components of the curriculum, including: birth to 3, 3 to 5, and severe and profound technological applications. Designed to complement the ACTT Starter Kit, the curriculum contains functional activities, specific hardware and software applications, and adaptations for various handicapping conditions. Cost: $40.00 plus shipping. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

Hutinger, P. (1983). *Macomb 0-3 core curriculum.* Macomb, IL: Macomb Projects, Western Illinois University.

This proven effective curriculum is an invaluable resource designed for use with children functioning in the 0 to 36 month range. Nearly 600 pages cover gross motor, fine motor, cognition, communication, social, and self-care curricular areas. Within each area, corresponding skill sequences, activities, references, and adaptations are provided. One set of program planning guides is included. Cost $49.95. Available from:

Macomb Projects
College of Education
27 Horrabin Hall
Western Illinois University
Macomb, IL 61455
309/298-1634

TechSpec (1989). *Sample course guide for an introductory course in rehabilitation and assistive technologies for occupational therapy students.* Madison, WI: Trace Research and Development Center.

This guide contains syllabus, lecture notes, and hand-outs for a course taught to occupational therapy students enrolled in the Technology Specialization Training Program (TechSpec) at the University of Wisconsin-Madison. It includes 14 different topics, and is approximately 150 pages. Cost: $35.00. Available from:

Trace Research and Development Center
University of Wisconsin-Madison
S-151 Waisman Center

1500 Highland Center
Madison, WI 53705-2280
608/262-6966

TechSpec (1989). Sample course guide for technology-related occupational therapy practica. Madison, WI: Trace Research and Development Center.

This guide contains a syllabus for a level 1 (60 hour) and level 2 (12-13 week) practicum for occupational therapy students enrolled in the Technology Specialization Program (TechSpec) at the University of Wisconsin-Madison. It includes general descriptions and detailed objectives and is 9 pages. Cost: $1.75. Available from:

Trace Research and Development Center
University of Wisconsin-Madison
S-151 Waisman Center
1500 Highland Center
Madison, WI 53705-2280
608/262-6966

SELECTED TECHNOLOGY PROJECTS

Assistive Device Center
Central Pennsylvania Special Education
Regional Resource Center
150 South Progress Street
Harrisburg, PA 17109
800/222-7372 (in Pennsylvania)
717/657-5840
***Contact:* Roland T. Hahn, II**

The Pennsylvania Special Education Assistive Device Center, funded by the Pennsylvania Department of Education, Bureau of Special Education, is a statewide service of the Central Pennsylvania Special Education Regional Resource Center (SERRC). Its purpose is to provide school personnel with consultation, training, and resources regarding state-of-the-art high technology assistive devices. ADC services are available to students with disabilities who are preschool to age 21, and to educators and parents who work with disabled children. The ADC is concerned primarily with communication aids and computer access devices.

Center for Technology
Delaware Learning Resource System
018A Willard Hall Education Building
University of Delaware
Newark, DE 19716
302/451-2084
***Contact:* Jennifer Taylor**

With the support of the Delaware Department of Public Instruction, Division for Exceptional Children/Special Programs, the Delaware Learning Resource Center has established a Center for Technology. The Center, housed at the University of Delaware, is committed to new technologies in the area of special education with major emphasis placed on computers and assistive devices.

COMPUTE (Coalition of Organizations in Michigan to Promote the Use of Technology in Special Education)
Wayne County ISD
33500 Van Born Road
Wayne, MI 48184
313/467-1439
***Contact:* Sue Kage**

The Coalition of Organizations in Michigan to Promote the Use of Technology in Special Education is an organization comprised of representatives of special education organizations in Michigan who have interest in the use of technology in special education. COMPUTE has developed a set of recommended competencies for special educators and administrators and a set of training modules to address these competencies. The modules include both instructional activities and carefully designed experiences to help special educators learn to apply technology in their teaching of handicapped students.

Kentucky Special Education
Technology Training Center
Department of Special Education
University of Kentucky
229 Taylor Education Building
Lexington, KY 40506-0001
606/257-4713
***Contact:* Jo Fleming**

The Special Education Technology Training Center within the Department of Special Education at the University of Kentucky is in the process of developing a series of training materials concerning the use of technology in educational programs for students with special needs. These materials are designed to be used by undergraduate and graduate students to assist them in learning about technology applications in special education.

The training materials consist of computer assisted instruction programs that are tutorial in nature. The programs are interactive and provide simulations and examples which require the student to enter information or solve problems. In-route questioning is employed to determine whether students understand the concepts presented.

Living and Learning Resource Centre
601 West Maple Street

Lansing, MI 48906
800/833-1996 (in Michigan)
517/487-0883
***Contact:* Donna Heiner**

The Living and Learning Resource Centre is a comprehensive information training, and demonstration center on the selection, development, and adaptation of high technology for educational and vocational purposes. The special focus of the LLRC is low-incidence populations, such as individuals with vision or multiple impairments.

Oregon Technology Access Project
1871 NE Stephens
Roseburg, OR 97470
503/440-4791
***Contact:* Penny Reid**

This project provides information, training and referrals regarding the uses of technology for disabled children birth to 21 years of age. Staff members provide direct training, disseminate information, provide a referral service and loan equipment. They have also developed a comprehensive long-term plan to deliver technology related services in Oregon.

Physically Impaired Association of Michigan (P.I.A.M)
PAM Assistance Center
601 W. Maple Street
Lansing, MI 48906
517-371-5897
800-274-7426 (in Michigan)

The major focus of PIAM is directed toward informing physically impaired individuals, parents, professionals and service providers about current developments in education, legislation, rehabilitation, and technology. A periodic publication contains up-to-date information about "light" tech materials and assistive devices geared for use by the physically impaired. Another publication focuses upon a single issue of relevance or an informational item crucial to the membership.

Project RETOOL
The Council for Exceptional Children
1920 Association Drive
Reston, VA 22091
703/620-3660
Contact: Elizabeth Byrom

Project RETOOL is a 3-year training project funded by the U.S. Department of Special Education and Rehabilitative Services and operated by The Council

for Exceptional Children (CEC) and its Teacher Education Division (TED). The project offers teacher educators an opportunity to gain knowledge and practical experience in the skills and materials needed to effectively use technology as a professional productivity tool and to incorporate technology into special education personnel preparation programs.

Technology Center for Special Education
University of Missouri-Kansas City
School of Education, Room 24
Kansas City, Missouri 64110-2499
800/872-7036 (in Missouri)
816/276-1040
***Contact:* Valita A. Marshall**

The Missouri Technology Center for Special Education is a project funded by the Missouri Department of Elementary and Secondary Education. Division of Special Education. The project is housed at the University of Missouri in Kansas City and offers training and technical assistance to Missouri special educators.

Technology in the Classroom
ASHA
10801 Rockville Pike
Rockville, MD 20852
301/897-5700
***Contact:* Deborah Bruskin**

Increasing the use of assistive device technology in the classroom would provide the opportunity for approximately 4.5 million children nationwide to reach their educational potential. To facilitate this opportunity, ASHA has launched a 3-year project to train teachers, special education professionals, and caregivers to effectively use assistive technology in the educational programs of children with severe handicaps. With funding from the U. S. Department of Education, Technology in the Classroom will develop, field test, and disseminate three self- instructional modules that will assist in the incorporation of technology in learning environments.

Each self-instructional module will offer, through videotape, examples with supporting print materials, strategies for applying assistive technology to the educational programs of children between the ages of 2 and 7 with severe handicaps. Emphasis will be placed on the implementation of educational programs within the least restrictive environment using an interdisciplinary approach.

Utilization of Innovative Applications of Assistive Technology for Students with Severe Disabilities
Department of Special Education
University of Kansas

Lawrence, KS 66045
***Contact:* Barbara Thompson**

The focus of this project is to train teachers and support personnel to use innovative applications of assistive technology with students who experience severe disabilities. Teams of personnel (teacher, speech pathologist, OT, PT) are trained together in developing applications of assistive technology that enhance students' opportunities to participate in least restrictive school and community environments. Assistive technology training is provided in summer credit-bearing workshops and through on-site instruction in local districts. Information on assistive technology will also be disseminated through a newsletter and regional and state workshops. The project is implemented by an interagency consortium of the University of Kansas/ Department of Special Education, the Kansas State Department of Education, and the Capper Foundation.

Variety Club/Temple University Computer Institute
Ritter Hall 301
13th and Montgomery Avenue
Philadelphia, PA 19122
215/787-5632
***Contact:* Gail McGregor**

The Computer Institute provides assistive technology services to school programs in the metropolitan Philadelphia area. This includes direct student training as well as technical assistance and support to teachers and therapists. In addition, a computerized database of assistive technology information is available to the general public.

SELECTED NEWSLETTERS/JOURNALS

Assistive Device News
Central Pennsylvania Special Ed. Resource Center
150 South Progress Avenue
Harrisburg, PA 17109

Assistive Technology
RESNA, Demos Publications, Inc.
156 Fifth Avenue, Suite 1018
New York, NY 10010

Assistive Technology News
National Easter Seal Society
70 East Lake Street
Chicago, IL 60601

Augmentative/Alternative Communication
Purdue University
South Campus Courts, Building E
West Lafayette, IN 47907

Augmentative Communication News
One Surf Way, Suite #215
Monterey, CA 93940

Closing The Gap
P.O. Box 68
Henderson, MN 56004

Communication Outlook
Artificial Language Laboratory
405 Computer Center
Michigan State University
East Lansing, MI 48824-1024

Computer Disability News
The National Easter Seal Society
70 East Lake Street
Chicago, IL 60601

Computers & Reading/Learning Difficulties Newsletter
6517 Ligget Drive
Oakland, CA 94611

ConnSENSE Bulletin
The University of Connecticut
Special Education Center Technology Lab, U-64
Storrs, CT 06269-2064

Current Expressions
Prentke Romich Company
1022 Heyl Road
Wooster, OH 44691

Journal of Special Education Technology
Vanderbilt University
2101 West End Avenue
Nashville, TN 37240

The Networker
Cerebral Palsy Association
1522 K. Street, N.W.
Suite 1112
Washington, DC 20005

Rehab Tech
Connecticut Rehabilitation Engineering Center
Human Resources Development
78 Eastern Boulevard
Glastonbury, CT 06033

Rehabilitation Technology Review
RESNA
1101 Connecticut Avenue NW, Suite 700
Washington, DC 20036

DIRECTORIES OF DATABASE INFORMATION

Center for Special Education Technology. (1989). *Directory of assistive technology data sources*. Reston, VA: The Council for Exceptional Children.

The directory lists 14 assistive technology hardware databases. Available from:

Center for Special Education Technology
1920 Association Drive
Reston, VA 22091
800/873-8255

Closing the Gap. (1989). *Closing the gap resource directory*. Henderson, MN: Author.

Closing The Gap issues a yearly directory of data sources that includes both hardware and software resources. Available from:

Closing the Gap
P.O. Box 68
Henderson, MN 56044
612/248-3294

Comprehensive Assistive Technology Curriculum Outline

Contribution Form

This Assistive Technology Curriculum Outline is a scheduled for updating in June 1991. The Center welcomes your feedback and suggestions for revisions to the outline. After you have used the curriculum outline, please complete this form and send it to the Center for Special Education Technology, 1920 Association Drive, Reston, VA 22091.

Name:

Address:

Phone:

1. How did this curriculum fit into your training program?

(i.e., Did the curriculum provide the structure for the course or series of courses? Was the content infused into an existing course? Was the outline used solely as a personal resource?)

2. Whom did you train using this curriculum?

(Include numbers of trainees, types of trainees, training setting.)

3. What changes did you make to the outline content when you used it?

(Please be as specific as possible, indicate page number and item. Feel free to attach xeroxed pages.)

4. What other references have you found helpful in your training that should be added to the outline?

(These could include readings, training materials, and curricula materials.)

For Outline update information, contact the Center in Summer '91 - 800/873-8255.