

Meeting the Needs of Students with Physical Disabilities

ACKNOWLEDGEMENTS

The Division of Student Support Services, Newfoundland and Labrador Department of Education
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CLOSE-UP

MEETING THE NEEDS OF STUDENTS WITH PHYSICAL DISABILITIES

Susan is a six year old girl in grade one. Susan loves to sing and has an impressive repertoire of Golden Oldies. One of her favourite songs is "You Are My Sunshine" which she has been heard singing as she wheels her wheelchair along the school corridor.

Susan uses her wheelchair to travel long distances within the school and to socialize with the other children on the playground. She uses an elevator to reach the gymnasium and cafeteria, thus the entire school is accessible to her. She is learning to use a Kaye-walker to travel short distances within the school - such as from her classroom to the library next door. The library is one of Susan's favourite places and choosing a book one of the highlights of her week. Susan has adapted seating for the library, as well as for her classroom.

The school bathroom has one large stall fitted with an extra-wide door to accommodate a wheelchair. It is also equipped with grab bars and a reducer ring to meet Susan's needs.

Susan's school bus is equipped with a wheelchair lift, and the Q-Straint system to secure her wheel chair.

To make fine-motor tasks easier for her, Susan uses a wrist splint, pencil grip, dycem to hold her notebook in place and adapted scissors. This year, Susan will begin learning to use a computer fitted with an expanded keyboard.

MEETING THE NEEDS OF STUDENTS WITH PHYSICAL DISABILITIES

A student with a physical disability may have any one of the following:

- orthopaedic impairment (acquired or congenital physical motor impairment)
- cerebral palsy
- spina bifida
- muscular dystrophy
- arthritis
- congenital anomalies
- osteogenesis imperfecta
- arthrogyrosis

CHARACTERISTICS

Physical characteristics of students with physical disabilities may include any one or a combination of the following:

- paralysis
- altered muscle tone
- sensory disturbance
- unsteady gait
- non-ambulation requiring alternate means of mobility
- loss of, or inability to use one or more limbs
- poor gross/fine and/or oral-motor control

Often students with physical disabilities have additional disabilities such as visual or hearing impairments, learning disabilities or cognitive delay. A student with a physical impairment may require adapted materials/equipment as well as additional support from teachers/other professionals to modify and adapt the teaching/learning environment to meet his/her unique needs.

TECHNOLOGY-RELATED STRATEGIES

When choosing a technological aid to compensate for or bypass a physical disability, the following factors should be considered:

- age
- developmental/cognitive status
- physical abilities
- present needs
- future needs of the student.

A transdisciplinary team should be in place for the decision-making process. In addition to parents, student, teachers, administrator, school psychologist and other educational personnel, other appropriate professionals might be a Speech Language Pathologist with expertise in Augmentative and Alternative Communication as well as Physical and/or Occupational Therapist.

Low-end technology can often provide sufficient support for the individual in a given area. Low-end devices are often more unobtrusive than high-tech devices, are generally less costly and more readily available and should not be overlooked in the decision making process.

Primary Areas for Technological Assistance:

1. Seating, Positioning and Mobility

Students with physical disabilities will require well supported seating and positioning in order to obtain optimal functioning. Improper seating and positioning may actually cause functional limitations.. The optimal seated posture is one where the trunk is supported in an upright, centered position with head in midline, with as much freedom of movement as possible to encourage interaction with and visual regard for the environment. The hips should remain bent at 90° and the thighs should be supported comfortably. This will allow the hands to be free for functional use.

For students who cannot achieve this desired position independently, various aids are available such as:

- Custom contoured seating systems for wheelchairs or school chairs
- hip straps, foot boxes to keep hips bent at 90° angle
- various easels, slant boards to place on the lap tray or table to accommodate books, writing material, keyboards, switches, etc.

Depending on the nature and degree of physical disability, a student may require technological assistance for mobility. This can range from splints, a walker or crutches to manual or powered wheelchair. Decisions on equipment needs in the area of mobility generally are made outside the school environment. However, input on functionality of a device and consultation about functional difficulties should remain part of the team responsibility.

Other areas where mobility aids are considered is in providing a choice of access modes in the school and community, as well as opportunities for varied forms of mobility during Physical Education classes and outdoor play. Suggested options to be considered would be adapted tricycles, scooters, battery-powered cars (R.J. Cooper, Assoc) and other ride-on vehicles, and sledges for outings to the rink.

Input from the Occupational and Physical Therapist is always recommended as part of this decision making process.

Environment accessibility at home, in the school and throughout the community also often depends on technological solutions, ranging from ramps, to automated doors, elevators with accessible controls and so on. Hydraulic lifts can assist in moving into and out of vehicles as well from wheelchairs to another chair or surface. Low tech solutions can include transfer belts or boards, and grab bars. Local medical suppliers have a wide range of devices to assist in this area.

Extensive information is provided on technological assistance for seating, positioning and mobility in **Programming for Individual Needs: Physical Disabilities** (1996). Prior to making decisions in this area, the Individual Support Services Team should refer to that document.

2. Daily Living, Environmental Control and Leisure Activities

Generally speaking, low end technology is used to assist individuals with physical disabilities in the areas of daily living and personal care. In the area of bathroom use, grab bars, alternate toilet seats, commodes and back supports are some of the common aids. Alternate commercial or customized plumbing fixtures can also provide for increased levels of independence in this area.

In the area of dressing, individuals with strength and coordination difficulties may need assistive devices to increase success. These can range from adapted fasteners to special devices for pulling up socks.

Students with physical disabilities can require assistive devices during mealtime because of fine motor as well as oral motor difficulties. These will assist the student towards independent, safe and socially acceptable eating and drinking. Plates with raised rims for easier scooping, utensils with built-up handles, cups with weighted bottoms, handles or cut-out rims are some of the range available. Medical supply stores and catalogues, as well as the Children's Rehabilitation Centre are good sources. Pictures of some of these items and additional information is contained in **Programming for Individual Needs: Physical Disabilities** (1996).

Technology can assist individuals to have some control over elements in the environment to promote independence as well as a sense of empowerment. An Environmental Control Unit (ECU), (also known as Automated Learning Device) is a simple technology that allows a person with a disability to control battery operated toys or electrical appliances using a switch. Through the ECU, the individual can turn on/off lights, TV's, stereos, fans, etc. For a child, this can allow access to battery operated toys and games.

3. Facilitate learning and academic success

Low tech devices can range from a pencil grip, or adapted scissors, to a slant board to promote appropriate placement of reading material, or a tape recorder for class notes or completing assignments. See also **Programming for Individual Needs: Physical Disabilities** (1996).

Computer Access

Computer Technology offers students with physical disabilities expanded opportunities for educational success. Computers also will offer improved opportunities in vocational settings, for communication, and for art, music and leisure activities. Often, the problem solving/decision-making process must determine alternate ways for the student with a physical disability to access the computer technology that is available to all other students.

This can be done through specifically designed adaptations to, or features of, either hardware or software. As the whole field of technology expands, some of these adaptations are becoming standard and are being used equally by the non-disabled populations. For example, Touch Screens provide mouse access for people with fine motor difficulties through a simple touch of the screen. These screens are also becoming commonplace in information retrieval systems at tourist booths, book stores and so on. Many commonly used word processing programs have built in accessibility features. When adaptations are required, these may be to the input method, in processing features and/or to output method.

Adaptations to Input

Modifications to the Standard Keyboard.

A keyguard - a hard plastic cover with holes for each key, to prevent accidental striking of a key.

Moisture guard - to protect the keyboard from drooling.

Access Utilities/Control Panel settings

These are features which modify various aspects of the keyboard to simplify its operation. They can:

- change the layout of the keyboard
- eliminate the need to press two keys at once through a function called keylatch
- slow down or eliminate the auto repeat feature to eliminate the problem of accidental repetition of a character. Microsoft Word and WordPerfect 6.0 have Access utilities. They can be explored by searching "Accessibility" through the Help Menu.

Use an Alternate Keyboard

Sometimes a substitute or replacement for the standard keyboard is needed. One of the following may be useful:

Expanded keyboard.

For those who can only target large areas expanded keyboards with larger keys are useful. Expanded keyboards can be used with the QWERTY configuration, and most can also be programmed for alternate layouts/functions (e.g. alphabetical order, numbers only, arrow keys only etc.)

A miniature keyboard.

Mini keyboards are useful for those students with very limited range of motion. Keyboards may also be tailored so that single keystrokes can produce frequently-used words or phrases.

On-screen keyboards

The keys are selected by a touch screen, a mouse, trackball or joystick, an electronic pointing device or through a scanning technique, by a switch.

Use Alternate Input Methods

A switch

- with an on-screen keyboard through scanning
- for various programs that require simple choice selection, through scanning or for cause and effect programs. See more detailed information on switches in Section III of this handbook.

Electronic pointing devices

- these allow the student to operate the cursor on the screen using ultrasound or an infra-red beam; good head control is needed; can be used in lieu of a mouse or with an on-screen keyboard.

Mouse, Trackball, Joystick

- mouse access can be provided for students with varying degrees of fine motor control.

Touch screens

- a simple touch of a point on the screen operates in lieu of mouse control. Provides direct selection. Can be used with on-screen keyboard.

Morse Code

- is considered a direct selection method and can be a reasonably fast input method.

Voice recognition

- voice recognition is an alternative input method by which a computer responds to spoken commands. It can be used to input text/data for writing as well as to direct computer functions. Voice quality, pronunciation will need to be carefully evaluated. This option is still very costly.

Adaptations to Processing Features

In addition to Access Utilities to modify the keyboard, described above, there are various other processing features that facilitate success for the student with physical disabilities. These include:

Menu Management Programs

- The use of macros, hot keys can reduce the time it takes the student to manage the program.

Abbreviation Expansion

- Abbreviations for commonly used words/phrases are programmed. Simply typing the abbreviation will produce the word/phrase eg. type ae and “abbreviation expansion” appears on the screen.

Word Prediction Programs

- As the student types a letter or two, an on screen list develops from which the student selects the word he wants. Additional letters create a new list. Many programs automatically incorporate frequently and recently used words into the lists.

These options are also described in detail in the section *Meeting the Needs of Students with Learning Disabilities*. The primary purpose for incorporating them for the student with a physical disability is to reduce the numbers of key strokes required. With reduced physical effort, and fine motor demands, the student will be able to complete the writing with increased speed and efficiency.

Adaptions to Output

Generally these will not be required for the student with a physical disability unless visual impairments or a learning disability present difficulties with screen access. In these cases, the relevant sections of the handbook will identify possible adaptations in output.

4. Communication

See section on *Meeting the Needs of Students with Communication Difficulties* in this handbook.

GENERAL STRATEGIES

Teachers can generally accommodate students with physical limitations by:

- ensuring that a student with a physical impairment feel accepted
- making allowances for a student’s high level of fatigue
- ensuring that the environment is physically accessible and safe

- providing for peer group understanding and interaction
- providing appropriate adaptive equipment and technology
- modifying demands for the volume of work produced. If a concept is understood, extra practise may take more time for this student than is warranted.
- providing time for re-teaching. Instruction may need to be paced differently for a student with a physical disability.
- providing instruction in the use of assistive technology. Ensure total support for use of technology.
- allowing alternate methods of evaluation to compensate for the physical limitations.
- engaging peers in support e.g. using NCR paper, have another student take notes for the student with a physical disability.
- ensuring that there is adequate opportunity for involvement in extra curricular activities.
- ensuring that field trip environments are fully accessible.