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# Selection of Appropriate Technology for Children with Disabilities

**REFERENCE:** Parette, H.P., Jr., Hourcade, J.J., VanBiervliet, A. (1993). Selection of Appropriate Technology for Children with Disabilities. *TEACHING Exceptional Children*, 25(3), pp.18-22.

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### Description of article:

The authors discuss the selection of appropriate technology for children with disabilities, particularly as it relates to recent reauthorization of public legislation which places greater responsibility on the schools to provide devices and equipment to students with disabilities. To meet this challenge to schools and teachers, the authors discuss recommendations such as the utilization of a team approach. They explore in detail how the team must consider both the characteristics of the children as well as of the technology in matching technology most effectively with any given student. A list of references is included as well as a table providing information on assistive technology conferences that occur nationally on an annual basis.

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## Introduction

Technology plays an important role in the lives of individuals who have disabilities. As used in this article, technology is defined as any item, device, or piece of equipment that is used to increase, maintain, or improve the functional abilities of persons with disabilities. These items, devices, or pieces of equipment may be commercially available or customized [Technology Related Assistance for Individuals with Disabilities Act of 1988, (Public Law 100 407) 29 U.S.C. 2202, §3(1)]. They are available for a variety of age and grade levels ranging from infants and toddlers to adults.

The devices that are available are as diverse as the needs and characteristics of the people who benefit from them. Augmentative communication aids are available for persons who are unable to speak that allow them to communicate their needs to others. Motorized wheelchairs are available for those who are unable to walk that allow them to move about in the environment. For infants and young children with disabilities, microswitches are used with adaptive toys to help them manipulate objects in their environment and learn about cause and effect. Talking alarm clocks and calculators are used by individuals with visual problems, allowing them to access important information that sighted people often take for granted. These and many other technological advancements are greatly improving the quality of life for individuals with disabilities. More specifically, these technologies enhance their independence and productivity and increase their ability to participate in the mainstream of society (Garner & Campbell, 1987; Vanderheiden, 1985).

Most schools have had some experience in providing devices and equipment to students with disabilities. Both PL. 94142; the Education for All Handicapped Children Act of 1975, and PL. 99457, the Education of the Handicapped Amendments of 1986, provided school systems with the flexibility to fund assistive devices and other related services as indicated in the child's individualized education program (IEP). However, since technology was not specifically defined in either legislation, considerable variation existed across the country regarding the provision of devices and equipment to students in educational settings (National Information Center for Children and Youth with Disabilities, 1991).

With the recent reauthorization of PL.94142, now known as the Individuals with Disabilities Education Act, or IDEA (PL.101476), assistive technology devices were finally defined using the earlier language of PL 100407. This places schools in the position of having even greater responsibility for providing devices and equipment to students in special education settings. Additionally, school districts must provide assistive technology services to eligible students with disabilities. These services are defined by the IDEA as "any service that directly assists an individual with a disability in the selection, acquisition, or use of an assistive technology device" [20 U.S.C. 33, § 1401(26)]. Thus, schools are now responsible for helping students select and acquire devices and equipment as well as instructing them in their use.

The increasingly expanding possibilities of technologies to help children in academic settings will require educational and related services personnel to rethink the scope of instructional opportunities for students with disabilities. In the past, many instructional activities may have been viewed from an administrative perspective to be impractical due to cost constraints or the degree of the student's disability (Cavalier, 1989; Cohen, 1989; Mendelsohn, 1989; National Information Center for Children and Youth with Disabilities, 1991).

Unfortunately, while it is clearly a violation of IDEA, it has been suggested that in the past the limited resources of school systems have, on occasion, played a role in the decisions made about technology provided for children with disabilities.

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## **A Challenge to the Schools**

In the future, devices and equipment will become easier to obtain as the costs of producing them decline

(Esposito & Campbell, 1987). With decreases in the costs associated with technologies that can help children to benefit from special education, a wider variety of devices and equipment is likely to be provided with greater frequency. Already, many schools have acknowledged a willingness to invest in more sophisticated technologies such as computers for children with special needs (Bennett & Maher, 1984; Office of Technology Assessment, 1988). Since information about and instruction in the use of the many different types of technologies used in school settings is an often-cited need of teachers (Office of Technology Assessment, 1988; RESNA, 1989), teachers will increasingly be encouraged to acquire more information about devices and assume more skills in technology service provision. As they acquire these skills, teachers must, in turn, use them to assist in the selection and use of equipment in the schools. Important meetings where teachers can obtain information and acquire skills are indicated in [Table 1](#).

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## **A Team Approach**

Within the public schools, the design and application of adaptations and technological devices are usually accomplished through a multidisciplinary IEP team of professionals and other interested parties including occupational, physical, and speech/language therapists; special and regular education teachers; and parents. Part of the assignment of the team is to ensure that all dimensions of a child's present level of performance are considered. This team approach is most effective when persons who have expertise in instructional programming-including technology and its applications-work cooperatively with parents and professionals who are involved in daytoday instruction of students.

Special education teachers who participate in such team processes may be called upon to assume important responsibilities as team members. Unfortunately, many teachers have had inadequate training and/or experience with technology and its applications. When teachers are not prepared for the responsibility of selecting devices for students and using them in classroom settings, they may rely too heavily on the judgment of other professionals (e.g., the occupational, physical, or speech/language therapist). These professionals may see the child and his or her needs from a very different (and more limited) perspective than does the teacher.

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## **Selection of Appropriate Technology**

It is important for the teacher, as well as all other team members, to develop a philosophical base around which decisions will be made when selecting appropriate technology for children with disabilities. It is also important to remember that the concept of "appropriateness" takes on several dimensions. P.L. 94142 was drafted to encompass any need the child has related to learning and/or development, including the need to learn basic selfhelp skills, have appropriate adaptive equipment, develop appropriate social integration skills, acquire basic prevocational skills, and receive therapy services. In each of these areas, devices and equipment can play critical roles in ensuring the provision of appropriate learning experiences for children with disabilities in public school settings.

From a more traditional perspective, a technology is appropriate when its application meets one of three criteria. First, it should be in response to (or in anticipation of) specific and clearly defined goals that result in enhanced skills for the student. Second, it should be compatible with practical constraints such as the available resources or amount of instruction required for the student and the teacher to use the technology. Third, it should result in desirable and sufficient outcomes (Office of Technology Assessment, 1982).

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## Determining the Fit

To match technology most effectively with any given student, the teacher and other team members must keep in mind two parallel considerations: characteristics of the student and characteristics of the technology.

### Student Characteristics

The characteristics of the child are of the utmost importance and must be considered first. The comprehensive assessment procedures that determine the child's present levels of functioning and precede the actual program development process provide the initial basis for selection of any devices or equipment.

In addition to the obvious selection implications of such characteristics as the child's academic skills, intellectual level, behavioral and social skills, and physical abilities, the teacher and other team members must consider the child's preferences for certain types of technology. An assistive device that appears excellent on paper but remains unused because the child is uncomfortable with it is the equivalent of no assistance at all.

Since the development of the IEP is a joint effort of a team that includes the child (when appropriate), the child can express his or her preferences during the decisionmaking process. Interviews with the parent and child can yield significant information that is not otherwise obtainable. For example, a girl may be uncomfortable using an augmentative communication system that employs a male adult voice. Alternatively, the IEP team may wish to determine which devices and equipment the child has had successful previous experiences with at school or at home. Once this information is acquired, the team may wish to purchase a similar technology for use in the school setting with appropriate modifications being made to meet the needs of the child. For example, a particular type of adaptive spoon may have made it possible for the child to feed himself or herself at home. The same type of spoon should be given consideration by the IEP team to assist the child with selfhelp skill development at school if this is deemed to be an important area of concern.

Additional considerations include anticipating the child's needs in the future. This is especially important with older students who are entering transition programs. For example, an older student with physical disabilities who has significant academic strengths may be a potential candidate to receive a modified computer system with adapted input and/or output modes. The IEP team may feel that development of computer skills may make it possible for the student to enter a career with a telecommunications firm such as AT&T or a business corporation such as IBM, both of which employ persons with disabilities. Many government agencies such as the IRS also employ significant numbers of persons with disabilities.

Given the concern that all school systems have for the equitable distribution of resources, cooperative arrangements for funding may sometimes become an alternative for IEP team consideration if a child is to receive a needed technology. Alternative financial avenues include the use of the Medicaid program and private insurance. Teachers must bear in mind the argument that any device identified and recommended by the IEP committee should be paid for with public funds. In practicality, it must be recognized that not all equipment that can benefit children can be subsidized by the schools. Spaceage technology is available through the National Aeronautics and Space Administration (NASA, 1988) that has limitless possibilities for technology applications for persons with disabilities. These technologies, such as robotics and artificial intelligence devices, are not yet commercially available on a widescale basis, and their expense would be impossible for most school systems to consider for all children with disabilities. In a case where a costly, commercially unavailable technology is deemed to be a desirable alternative for a child with a disability, the IEP team may choose to find partial

external funding for the device. This may enable the school to provide a specific technology that would not otherwise be possible.

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## Technology Characteristics

Once relevant characteristics of the child have been identified and considered, the focus is placed on the characteristics of the various technologies that will be considered for the child. Goals for the use of devices should emerge as a result of the assessment of the needs, desires, and capabilities of the child. In examining the range of technologies that might be useful for a child with a disability, a variety of factors should be considered carefully.

The availability of the equipment is crucial. Sometimes technologies are not in vendors' stock, and they require lengthy periods of time to manufacture. This is particularly true of small firms that market products that are in large demand and are modestly priced. Delivery of such equipment sometimes can take 2 to 3 months once an order has been placed. It must also be remembered that most commercially available equipment cannot be modified by the manufacturer to meet the unique needs of a child with disabilities. Generally, devices must be customized or modified by others once the technology has been purchased for the child. This may require significant amounts of both time and money.

The simplicity of operation of the equipment is an important area of consideration. Too often schools purchase technologies that are overly complex and require tremendous investments in instruction of teachers and the children who are recipients of the equipment. When devices require large amounts of teacher time to learn to operate and maintain, most teachers will understandably be reluctant to use them. Such devices often are relegated to a storage closet in the school.

The initial and ongoing costs of the technology are one of the most frequently expressed concerns of school personnel at the administrative level (Cavalier, 1989; Office of Technology Assessment, 1982). Installation costs (if any) must be considered, and this additional significant expense may not be reflected in the price quote provided to the IEP team by the vendor. The cost of daily, monthly, or annual operation must also be given consideration. Some devices, particularly those that require power packs or batteries, may incur frequent and unanticipated replacement expenses. Augmentative communication devices and power wheelchairs are two examples. Other equipment may require periodic maintenance, with its associated costs.

Since many technologies will be used for a long period of time, adaptability to meet the changing needs of children over time must be carefully considered. For example, a communication device that can be modified over time to continue to meet the evolving needs of a child with a disability would be more desirable than a device that could be used only for 1 year.

Another important consideration in the selection of technologies is the reliability and repair record of the devices. Some technologies, or certain brands or models of those technologies, require lengthy or frequent repairs. In fact, most augmentative communication boards and power wheelchairs require ongoing repair. Since communication boards are used frequently throughout the course of a day's activities, they become worn, soiled, and damaged. Children who sit in wheelchairs daily will cause wear and damage to the seats, armrests, and other padded surfaces of the equipment. In either case, once the technology is removed to be repaired, the child is denied access to a device that enhances the quality of life.

Teachers and other members of the IEP team may ask representatives of companies that sell certain types of

equipment about the reliability and repair records of their devices. Sometimes there may be product testing information regarding specific technologies that is available to the IEP team on request. However, the best information about device reliability can probably be obtained from children who use the devices. In Arkansas, for example, a user network will be developed in the state technology system that has been funded under P.L. 100407 (Arkansas Division of Rehabilitation Services, 1991). This system will be patterned after the parent network established by the Association for Retarded Citizens in many states. Basically, such a network is made up of volunteers who agree to act as contact persons within the system for anyone wishing to get information about a particular type of technology. Thus, a teacher or anyone else who is considering buying a specific device for a child with a disability can learn of the personal experiences of a person who has used the technology. In states where such a network is not being developed, teachers may contact local advocacy groups and attempt to identify people who are using certain technologies. These individuals may then be contacted and questioned about the reliability of the equipment.

Finally, the teacher must examine the ability of the technology to provide performance or evaluation data necessary for the documentation of student progress. Certain technologies, especially computer-based devices, readily lend themselves to objective behavioral recordkeeping strategies. A computer spelling program that maintains an ongoing count of the number of lessons a child has completed and the accuracy of those performances lends itself more readily to recordkeeping for IEP and other purposes than would an instructional program that requires the direct observation of the teacher. As technological advances continue, assistive devices for students with disabilities will continue to grow in power, usefulness, affordability, and wide-spread utilization. As core members of the IEP committees, special educators increasingly will be called upon to develop new technological competencies, not only in the use and maintenance of the evolving technologies, but in their prescription as well. By basing such decisions on ethical concerns and completing careful and systematic analyses of the characteristics of both students and technologies, teachers can help to ensure that all children achieve maximum levels of learning and independence.

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**This material was developed by the [National Center to Improve Practice \(NCIP\)](#), located at Education Development Center, Inc. in Newton, Massachusetts. NCIP was funded by the U.S. Department of Education, Office of Special Education Programs from October 1, 1992 - September 30, 1998, Grant #H180N20013. Permission is granted to copy and disseminate this information. If you do so, please cite NCIP. Contents do not necessarily reflect the views or policies of the Department of Education, nor does mention of trade names, commercial products, or organizations imply endorsement by NCIP, EDC, or the U.S. Government. This site was last updated in September 1998.**

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