



DIRECTIONS

Technology in Special Education

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Support for Computer Use in Special Education:

The Team, Networking, and Technical Support

By Dorothy Laufer

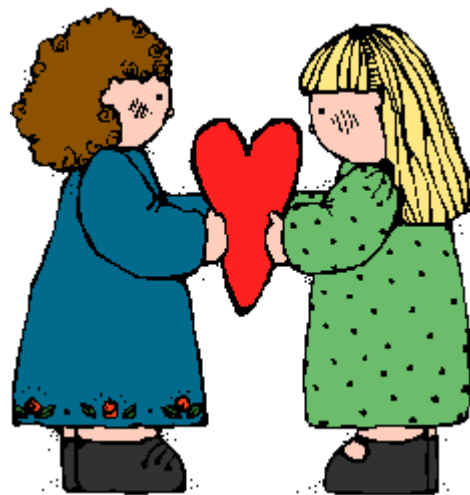
Source: *The Catalyst*, Winter 2000, Volume 17, #2

If ever there were a contest to see which teacher was best qualified to write about Support, Dorothy Laufer would surely win hands down. Not only is she familiar with support in many settings, she has also had all too much experience without it. Her three terms in an ESL classroom in the fledgling Czech Republic (described vividly in previous issues of The Catalyst) exposed her to nearly everything that could happen to a teacher with no support and no common language. In this article Dorothy focuses clearly on the components which are essential for successful use of technology in a special ed setting and provides a valuable list of resources at the end. We suggest that our readers save this article for future reference, and take heart-support is achievable, if you know what to ask for!

You cannot do it alone! Anyone working with adaptive technology will tell you that this is a job that requires support. Support, as I see it, comes in many forms. For purposes of this discussion, I would like to categorize and discuss support under three headings: *The Team*, *Networking*, and *Technical Support*. My comments are based on my own experiences as a computer teacher and computer support person in a special school, as well as an ESL teacher.

The Team

I recently asked people who work with adaptive technology in a school/rehab center what their greatest support was; each of them replied quickly, emphatically, and without any hesitation that it was the team they worked with. In my own experience, I recall that the team was a very important area of support. You may be thinking, *what do you mean by "the team"*? In our case, it was a 3-person team: a computer teacher, an occupational therapist and a person from the augmentative communication



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(speech pathology) department. We met on a regularly scheduled basis, one hour each week. Sometimes we were able to schedule this during regular working hours; at other times it had to be scheduled immediately after the regular teaching day ended, from 3-4 p.m. We discussed a specific problem case during each meeting. It has been my experience that solving one problem had far reaching effects for other students.

Team meetings often resulted in assigning certain tasks to one or more persons. When access was a problem, the Occupational Therapist handled it. Someone from speech therapy often worked individually with a student and I was in a position to implement a program on a 1:1 basis. The computer teacher often had a volunteer available to help carry out a 1:1 program. Communication with the family was one of our goals, and any of us might be in the best position to keep the family informed. Progress is sometimes slow to see and difficult to assess, so feedback from one member of the team helped us to stay inspired and focused.

I think that each team formation would differ, depending on the circumstances. In a regular school, for example, I could see the team being composed of a small group of teachers with the principal being invited to meetings when necessary. One of the possible outcomes might be communication with other teachers about exact goals or techniques and how the teachers could contribute and/ or be involved.

I would like to point out that, depending on where you are in your own computer use and needs, a team

may not be the starting point for support. In my case, the team support only came later. Networking was my first and very important support.

Networking

Since I started the computer program in my school/rehab center in the 1980s, I had to look outside of our own facility for support. I soon heard about others working in the field and it was fascinating to find out what worked for them. I believe that knowing what works for others is a good way to consider what might work for you. Fortunately, many people documented what they were doing, and reading about their experiences made my path very clear.

I was greatly inspired by Seymour Papert and the group from MIT (see references) who used LOGO with people who had physical disabilities. This was before the internet; their books were readily available and are still on my bookshelf. I think that anyone reading these books, today, would still find them useful and of high interest.

Journals and publications were also what guided me, as well as the information I gleaned by attending conferences. At conferences I could see and touch the equipment, hear about the latest developments in practical work and in research, and speak directly to the people working in the field. The information in journals kept me informed about current happenings. The Council for Exceptional Children (CEC) publishes journals and books (see references). One of their divisions, TAM, focuses on technology and media. I was lucky to attend at least one TAM

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conference, which was very helpful in my work. Another important conference for people in this field is Closing The Gap's annual conference, in Minneapolis, Minnesota, where the latest happenings in adaptive technology are discussed. They also publish a very informative journal. Of course, *The Catalyst* is still another newsletter with information about resources, conferences, books-and support.

I also networked with a group of people in my area who had similar interests and concerns. We met regularly and discussed common problems and achievements, and we did some "show and tell." I really valued this contact. Today, we would do some of this via e-mail, but I think we would still want some direct contact. Our school district supported this group, and that was important to all of us.

I would also like to point out that, although special software and adaptive equipment are important and sometimes the only way a person can access the computer, a teacher working in adaptive technology should know what is happening with computer use in regular education. ISTE: The International Society for Technology in Education (see references), publishes a journal called *Learning and Leading with Technology*, as well as a newsletter. They also publish books. This organization is at the top of my resource list. The newsletter from the Computer Learning Foundation is another very valuable resource and I have included their address as well in my reference list. Their newsletter is free.

Technical Support

The needs for technical support are varied and are constantly changing. The kind of technical support you need will depend on who you are working with, how much experience you have, the equipment you are using, etc. I recently needed support to use an LCD screen so that I could focus all attention on one screen, and I have also recently required support to deal with a networked system. Ideally, you want to have someone who is on site, knowledgeable and *available*. Unfortunately, this situation is not always the case.

We were very lucky to be able to have a technical expert available to work with us, but this was given to us in the 1980s, when adaptive technology was in its infancy. He helped us to work with the few tools that were available then. Once Kemx became available, it was much easier to make the adaptations required so that someone could use a switch, and/or Morse Code to access the computer. Our technician also wrote software and adapted public domain software so that it could be used with a switch. We were very excited when he wrote a single-switch typing program and when he created a "mailbox program" to simulate e-mail. I remember how useful his adapted public domain programs were, allowing our students to play Othello, go bowling, and even draw with a switch.

Help in writing specialized programs also came from a professor at McGill University, who was really interested in his computer science students having useful programs instead of ones that would sit on the shelf. We were thrilled with the single-switch

Checkers and Snakes-&-Ladders games, which the computer science students created and which were used for many years. In designing the activities we had to decide whether the game piece should go up and down the snake/ladder automatically or whether it would be better for the student to control that with the switch. We discovered that both versions were useful, depending on the student. It was really a learning experience to design the software.

Some of the information I needed then is now available directly from the companies selling the equipment. Don Johnston (see references) is one of those companies. Many Frequently Asked Questions (FAQs) are posted on their web site. I think everyone working in the field of adaptive technology should own one of their current catalogues, which can be obtained by phoning 800- 999-4660 (Canada and U.S.). This phone number also gives you access to a live person who can help with your technical questions. There are also other companies, e.g. Intellitools, that sell their own equipment, are on the web, have useful catalogues, and whose products are invaluable in adaptive access.

In order to be able to network and have team meetings you require a certain amount of time and a very supportive administration and school district. I was very interested to read the report from the National Academy Press which emphasizes that "teacher education should be a seamless continuum that supports them, throughout their professional careers..." The report, which can be read online, asks that the responsibility for educating teachers be broadened beyond schools of education

to include academics, school districts and society as a whole. This report allows us to demand and expect our school districts to support the use of adaptive technology by funding our needs as described in this article.

Many of the things I have spoken about require no money; they need organization and time. I believe that if you put these things together—Teamwork, Networking, and Technical Support—, you will have TNT, and in the world of computer use, that's dynamite!

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<http://www.tamcec.org>

<http://www.iste.org>

<http://www.iste.org/L&L>

<http://www.nap.edu>

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Assistive Technology

Associate Editor's Column

Tamarah M. Ashton, California State University, Northridge

Source: JSET: Journal of Special Education Technology, Vol. XV, #1, Winter 2000

It is virtually undisputed that the 20th century will be best remembered for its vast technological developments. Typical, everyday uses of technology have moved us from (a) radio broadcasts to large screen, high definition, color televisions, (b) typewriters to word processors, and (c) silent pictures to surround-sound movie theatres. Scientific uses of technology made space exploration possible and medical technology has aided in the discovery of many new diseases and their treatments. The field of special education has not been left out of this technological boom. Advances through technology have been realized in products which aid in the daily lives of persons in all disability categories. As a whole, these products have come to be known as *Assistive Technology*.

The Individuals with Disabilities Education Act (IDEA) operationalizes assistive technology (AT) for educators as "any item, piece of equipment, or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with disabilities." A common misperception is that all AT devices are computerized, extremely expensive, and require extensive training before they can be incorporated into someone's life. Three types of AT are described below (Lewis, 1993) with examples to show how this is not the case.

The first type of AT are *adaptations of generic devices*. An example of this kind of AT would be a handheld talking dictionary; a basic item, in this case a dictionary, is commonly found in homes and work environments and is inaccessible to many individuals. By putting it into an electronic form with speech, it can be included in this category of AT due to the addition of components to meet someone's particular needs.

The second type of AT devices are *additions to generic technology* such as telephones or televisions with pneumatic sip-and-puff switches or text-to-speech software that reads on-screen text aloud. Adding something to the device can change how someone interacts with that device (i.e., "on" or "off" switches). Even a baseball-cap head pointer would be included here. Simply by attaching a pointer to the top of a cap, an individual can independently operate a computer, calculator, or any other item where keys must be pressed in order to give input.

Type 3 AT are *equipment and devices designed to do things that generic technology cannot*. These would include such items as augmentive and alternative communication devices or classroom amplification systems. No common, everyday items are available to complete these same functions; therefore, they fit into the third category of AT.

A caveat to the three types of AT must be stated. Relatively "high tech" examples were given in each of the categories above. However, within each of these three categories, it is important to

remember that high- and low- tech items may exist. For example, at first glance, pencil grips (type 2) may not seem to be technological devices, but definitely fit IDEA's definition of AT as being items which are used to maintain a functional capability (e.g., handwriting).

As cited in Blackhurst and Edyburn (2000), Melichar (1978) describes a seven layer model of human functioning. These seven areas can be aided with the use of AT if they are a problem area for any given individual.

***Existence problems-** These problems relate to difficulties in maintaining the functions needed to sustain life and could be assisted with the use of items such as adapted eating utensils and various dressing aids.

***Communication problems-** Problems in this area are typically associated with functions needed to understand and convey information. Possible AT options for communication problems would be magnifiers, close-captioning, and adapted keyboards.

***Body support, protection, and positioning problems-** These problems typically include difficulty with standing, sitting, or positioning. AT solutions might include adapted furniture, head gear, and slings.

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ACCESSIBLE LEARNING

by Lorianne Hoenninger

Dyscalculia is a learning disability concerning mathematics. Students with Dyscalculia have difficulty understanding and using math concepts, and difficulty writing its symbols.

Assistive Technology can offer many solutions, both high and low tech, to help students with Dyscalculia, and this month's column will focus on a few of the tools that have been found to be most useful.

Edmark's Mighty Math Series (<http://www.edmark.com>) is the commercial mathematics software I recommend most often. The "Mighty Math Series" is a sequence of math software products that use virtual manipulatives to improve student comprehension. These software programs are designed to increase students' ability to visualize and connect concrete and abstract math concepts, by allowing students to explore, manipulate and try many options to further their understanding of numerical ideas and calculations. Edmark includes accessibility for switch users, and both visual and auditory prompts and feedback into all their products, to accommodate physically challenged, visually impaired and hearing impaired students.

Sunburst Software (<http://www.sunburst.com>) also incorporates virtual manipulatives into many of their programs. Such titles as "Equivalent Fractions" include built-in instructional aids as counters, number lines, base-ten blocks, hundreds charts, or fraction strips that can provide a student with the necessary tools for successful math computation.

Talking calculators are a simple, low tech tool for students with Dyscalculia. The voice output of a talking calculator provides the necessary auditory feedback to the user to prevent input errors. Hearing the calculated answer provides a check against number transposition. Independent Living Aids at <http://www.independentliving.com> carries an inexpensive talking calculator in their catalog that reads the entire number as a unit to the user. For example, if the answer is 530, it says "Five hundred thirty", as opposed to the "five three zero" that would be recited by many other talking calculators.

For students with difficulty writing numbers, a printing calculator may be the answer. Printing calculators are available in most office supply stores for about \$20.00, and can be used to write columns of right-justified numbers, without calculating. A student with difficulties lining up or producing numbers could type his work into a printing calculator, and scotch tape the resultant printout into his workbook or class work ditto.

For students who cannot write numbers at all, hands and mouse free math programs are available through Metroplex Voice Computing (<http://www.metroplexvoice.com>). Metroplex carries a variety of software products for students who need to do their math computations by voice. Voiced mathematics products include ArithmeticTalk (grades 1-5, for addition, subtraction, division, and multiplication), MathTalk (grades 6 through Ph.D and professional levels,

with over 2,000 math commands); MathBrailleTalk (voiced text and mathematics emboss and/or printing), VoiceEZcalc (operates the Windows 95™ calculator by voice for use with all of the programs), MathTalkPro (runs Scientific Notebook, including Maple and graphing capabilities); and VoiceEZcad (operates AutoCAD™ by voice).

The shareware available on the internet to support mathematical learning is staggering in its abundance. There are many fine programs for both the Windows and Macintosh platform. My favorite math shareware program, though, is "Mathflight" from <http://www.datacom.ca/~ron/mathfl.htm>. This visually simple program includes seven levels of difficulty for practice of basic math computation. It is suitable for use with young children, middle school students with learning disabilities and young adults with cognitive disabilities needing practice with basic addition, subtraction, multiplication and division.

Math Rescue available from <http://www.kidsdomain.com/down/pc/clickmoney.html> is a DOS based Nintendo-type game that will entice students to practice basic skills. Three levels of difficulty present basic addition, subtraction, multiplication and division through computational and word problems. It should be noted however, that the reading level for the word problems is not commensurate with the computational levels.

Macintosh users may want to explore a program named "+(Compliment)

1.0.1". Downloadable from <http://www.rapid.tukids.tucows.com/mac/5-8/preview/145404.html>, this \$2.00 timed, shareware product consists of a small window with a number from 1 to 9 in it. Students must figure out what number, if added to that, would equal ten.

Fastball Fractions for Macintosh from <http://www.dimension.com/~janf/fastball.html> is a color fraction game with a baseball theme. Features include a fraction tutorial showing how to solve problems step-by-step, choice of one or two players and variable levels of difficulty and speed.

At <http://www.littlefingers.com>, Bone Appetite for Macintosh is freeware. Players own a shop and must go and buy bones to keep their canine customers happy. When their canine friends come to the store to buy bones, players must give them the correct amount of money back or they will get angry!

Finally, Mattie's Math Games for Windows (<http://latticeworksw.com/mattie.htm>) is a collection of games designed to help students with number recognition, counting and number order, addition, subtraction, multiplication and division. Thirty-nine different types of math problems are presented in the four game environments. The colorful graphics, voices, sound effects, and background music all add to the highly interactive, very intuitive play. Mattie helps by giving instructions and clues. Incorrect responses are treated humorously.

I hope you find these programs and devices as fun and useful as I do. As always, if you have questions, do not hesitate to e-mail me at accessiblelearning@erols.com, visit my website at www.accessiblelearning.com or write c/o: Accessible Learning Technology Alternatives, P.O. Box 597, Shirley NY, 11967. §

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***Travel and mobility problems-** *Walking*, climbing stairs, and generally navigating one's environment are typical problems in this area which can be aided with the use of such items as walkers, canes, and wheelchairs.

***Environmental interaction problems-** These problems are related to activities across environments. AT devices which might be beneficial include automatic door openers, various switch options, and remote-controlled devices.

***Education and transition problems-** These problems include the functions needed to succeed in school settings. Common AT solutions in this category include educational software and computer adaptations.

***Sports, fitness, and recreation problems-** This category includes problems in participating in fitness related and arts and crafts type activities. Modified sports equipment and switch-activated scissors might be useful AT devices in this category.

When the definitions for assistive technology devices and assistive technology services were included in IDEA, it was made very clear to parents, consumers, and service providers that AT should be considered as an important component to the educational programming for each student labeled as having a disability. For this reason, this added dimension has garnered a great deal of attention in recent years. As we move into the 21st century, it seems that developments in Assistive Thchnology are taking place faster than AT professionals can absorb. Therefore, the purpose of this newly established feature column in JSET is to highlight important and innovative advances in assistive technology. In each ensuing issue of JSET; this column will focus on a different topic; hopefully; topics requested by the journal's readers. Guest writers may be asked to contribute their particular area of expertise. The goal is to cover a broad spectrum of what is currently available, as well as new developments in the field of AT.

If you have an idea that you would like to see covered or you are interested in

being a guest writer, please send your comments to:

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