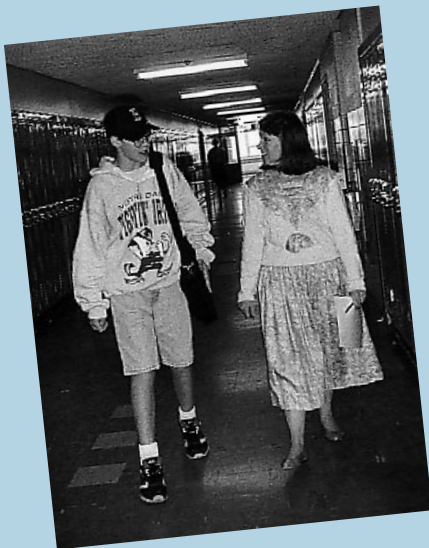


What's Inside

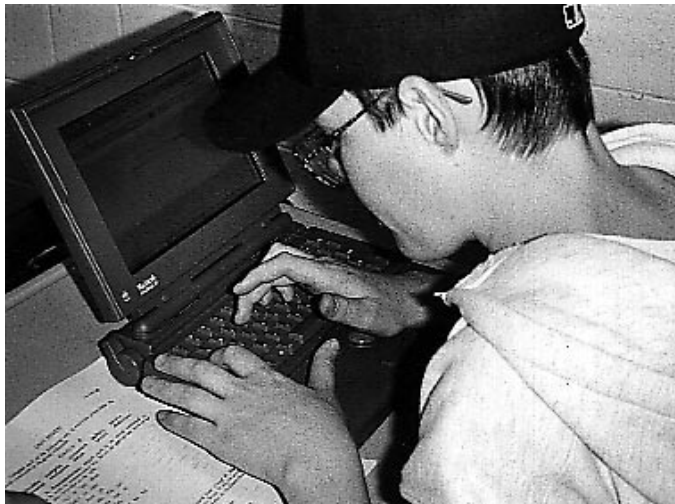
- How laptops benefit students with disabilities
- What to consider when implementing a plan for laptop use
- Examples of how schools are using laptops
- Features of portable computers and writing tools
- A list of additional resources about laptops on NCIPnet



Lightweight and portable, laptops can be carried from class to class as easily as bookbags.

NCIP is the National Center to Improve Practice in special education through technology, media, and materials.

Learning with Laptops



Because laptops can help students with learning disabilities write in different settings, some schools are implementing programs in which students are given access to these portable computers.

Schools Address Implementation Issues

In an ideal world, students who need computers to write effectively would have them in their classrooms, at the public library, and on the kitchen table at home. In reality, schools must find ways to make a limited number of computers widely available for as many students as possible.

Portable laptop computers can provide students with disabilities access to writing in many settings. Once a school decides to establish a program in which students are given access to laptops, however, teachers and administrators must grapple with a variety of implementation issues. Three key questions that must be answered are: What criteria should be used to decide which students have access to laptops and for what purposes? What systems will be used for scheduling and managing the use of laptops so that they can be used in a variety of settings? And finally, How will the laptops be kept secure and in good working order?

The solutions will vary and depend upon a school's available resources, its organizational structure and curriculum, and the needs of its students. The story that follows on pages 2 and 3 provides an example of how one high school addressed these issues. Also profiled on the next pages are other school programs that have successfully dealt with a variety of implementation issues that arise when students are given access to laptop computers.

Laptops to the Rescue at Shrewsbury High

In the spring of 1993, Caroline Gilmore – a teacher of students with learning disabilities at Shrewsbury High School in Massachusetts – noted there were several students with significant learning disabilities on the roster of incoming eighth graders.

Caroline knew that these students had been using desktop computers in the middle-school resource room to circumvent their mechanical difficulties when writing. Thinking about the high school curriculum, she realized that these students needed access to computers in their mainstream classes.

Who Should Have Access

Caroline was aware that Shrewsbury High School had five laptops that were housed in the computer lab and available to both students and teachers on a sign-out basis. She knew, however, that students with learning disabilities had not used this resource in the past. To explore ways these students could gain access to the laptops, she met with Donna Simone, the school's special education coordinator, and Brian McDermott, the district technology director.

The group agreed that laptops could help students with disabilities participate more fully in mainstream classes. Brian then procured two

additional laptops for the special education department.

Caroline identified two students who, because of their fine-motor impairments and attentional problems, were unable to write successfully without a computer. Because of the severity of their disabilities, it was decided that these students would be given priority access to the two SPED department laptops.

The group also decided that Caroline and other teachers of students with learning disabilities would target specific situations in which other students could benefit from using laptops.

A rolling cart designed for an interdisciplinary project at John Glenn Middle School in Bedford, Mass.



Dock 'n Roll: Laptops on Wheels

At John Glenn Middle School in Bedford, Massachusetts, sixth graders are using laptop computers for an interdisciplinary project that spans four classes: language arts, social studies, science, and math.

Before this project began, the John Glenn teachers raised the following concerns about the program: How will the computers be transported from classroom to classroom? How will teachers monitor and assess student work? How will students save and print their work?

To address their concerns, a large rolling cart was designed. The cart contained six laptop computers with six docking spaces, a desktop computer, and a laser printer.

Students involved in the project roll the cart from one classroom to another. As needed, they take laptops out of their docking spaces where batteries have been recharging. Students can print documents by connecting their laptop to the printer on the cart.

When docked, the laptops are connected to the desktop computer so teachers can easily access student files to evaluate work and type in comments. Each laptop's hard drive can also be backed up on the desktop computer, so if students accidentally erase their files, a copy can still be accessed.

How Plans Are Implemented

While this approach has been in place for nearly a year, it continues to evolve. When teachers identify a student's need for a computer, they first check to see if one of the SPED department computers is available. If both are being used, they speak with Sue, the computer lab coordinator, and sign out one of the lab's available laptops. The teacher or student then picks up the computer for the specified periods and returns it afterwards.

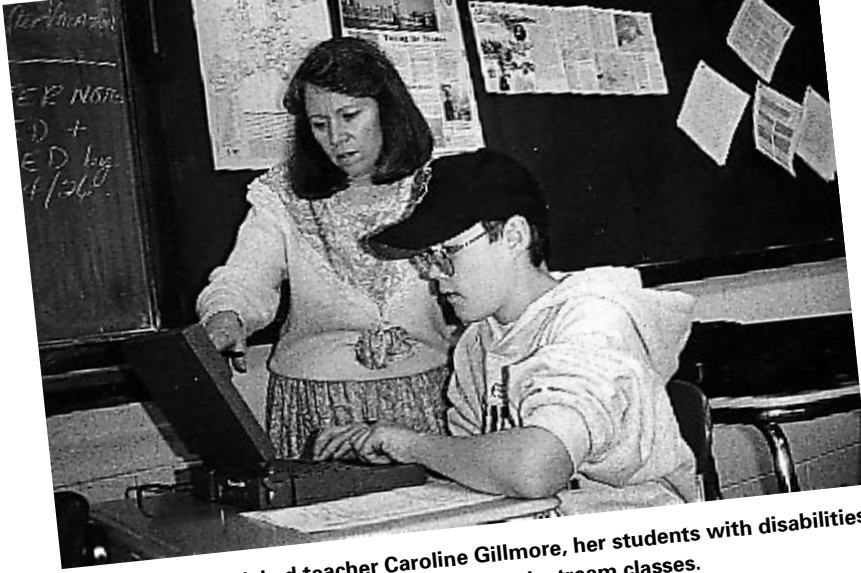
Increasingly students are taking responsibility for reserving, picking up, and returning school laptops. As part of a larger effort to promote self-advocacy skills, students are encouraged to anticipate assignments or classes where laptops would be of tremendous use. After identifying these situations, students are encouraged to make the necessary arrangements to acquire laptops and return them on their own.

To minimize confusion, a desktop application called At Ease™ is loaded on each laptop that insures students save files on their own "save disk" and not the hard drive. These floppy disks are primarily housed in the resource room to help safeguard against damage or loss. Teachers or students retrieve the needed disk from

Round-the-Clock Access

In St. Cloud, Minnesota, educators in District 742 believe that if a student's ability to communicate effectively is dependent upon technology, he or she should have access to that technology at all times. This strong commitment has motivated district staff to find ways to ensure that students with communication disorders have 24-hour access to assistive devices. More recently, students with severe writing problems have also been given round-the-clock access to laptop computers.

Families and community organizations in the district are often asked to play a role in the implementation process. For example, the district may buy a



According to special ed teacher Caroline Gillmore, her students with disabilities who are using laptops are thriving in their mainstream classes.

the disk box in the resource room and return it after the students' current work is saved on the disk. Individual "desktops" that give users access only to the applications they need can also be created with At Ease.

Students are able to print out their documents either in the resource room or in the computer lab. Students may also reserve laptops from the computer lab for home use. As with the in-school lending programs, this is arranged on a first-come, first-served basis.

Keeping Laptops Secure and Running

Laptops were initially designed for incidental business use, not for the wear and tear exacted by even the most

careful students. Security and maintenance issues must be addressed when laptops are being crammed into backpacks, dropped off in lockers, and taken off school grounds by different students.

At Shrewsbury High, the laptops are stored in locked cabinets in the computer lab and the resource room. To minimize damage, the school has invested in padded carrying cases. If anyone notices a problem with a computer, they inform the computer lab coordinator. Twice each week, a technician from a computer company contracted by the school district comes to fix and maintain the computers.

Before a laptop can be taken home by a student, a parent or guardian must sign and submit a form stating that

his or her homeowner's or renter's insurance policy will cover any loss or damage to the computer when it's in the student's possession off school grounds.

Evidence of Success

Caroline reports that many of her students with disabilities who are using laptops are thriving in mainstream classes. For example, one of her students can begin his extensive vocabulary assignments on a laptop in English class and finish them later in the resource room aided by coaching from Caroline. Rather than falling behind his peers, this student has been given a tool that helps him keep up the pace and succeed.

Recently, two students with learning disabilities arranged to have laptops over a period of several days so that they could participate in a school-wide writing contest. They worked on their stories in their language arts classes, in the resource room, and at home. When their work was complete, both were proud of their entries.

Demand for laptops is certain to grow as more and more Shrewsbury teachers become aware of the ways in which these portable computers can help students who have difficulty writing. Looking ahead, educators at Shrewsbury are currently extending a school-wide network that will allow students access to their files from any computer in the school.

laptop in conjunction with a community service organization, parents may purchase the maintenance contract, and the school may carry the insurance.

The individual student's educational plan (IEP) is the centerpiece of this approach. The technology is written into the IEP as a tool for meeting specific educational goals (access to the technology is not the goal in and of itself). Teachers, parents, and administrators agree upon the implementation details and these are explicitly documented in the IEP.

Project PULSE: One Student, One Laptop

As part of Project PULSE (Pupils Using Laptops for Science and English, sponsored by the Center for Technology in Education), a group of students at the Abraham Clark Junior/Senior High School in Roselle, New Jersey, were given laptops to use for the entire school year.

Before receiving their computer, students signed an agreement outlining their responsibilities for the laptop's safety. Teachers also provided students with a schedule detailing what should be done with the computer during each part of the day, as well as a list of places that were off-limits to laptops (including the cafeteria and the gym). A

lockable closet was provided for times when students needed a safe place to leave the computer. As students became more adept at negotiating school with a laptop in tow, policies became more flexible.

Students were urged to keep their laptop batteries charged. For times when batteries unexpectedly ran down, power strips were installed in classrooms where computers were used most. When computers malfunctioned, extras were available as short-term backups.

For more information see "Year One of Project PULSE: Pupils Using Laptops in Science and English," written in 1993 by K. McMillan and M. Honey in volume 26 of *Technical Report*, a publication of the Center for Technology in Education in New York.

Electronic Writing Tools and Portable Computers

Electronic Writing Tools

The following portable writing tools offer fewer features and memory than the laptops described at right, but are available at a significantly lower cost.

Diskless Portables

(approx. \$240/discounted when purchased in quantity)

The Laser PC4™, for example, is a two-pound, battery-operated laptop computer with a standard keyboard and built-in programs for word processing, spreadsheets, and databasing (the screen, however, displays only four lines). Files can be transferred to and from Macintosh®, Apple®, and DOS computers, as well as e-mail networks.

Simple Note-Takers

“Smart Keyboards”: (approx. \$270/discounted when purchased in quantity) These portable keyboards can be used for taking notes and can store up to 15 pages of text. The AlphaSmart™, for example, is a Macintosh-compatible, battery-powered portable keyboard with a built-in four-line screen display. Text can be entered and edited and then easily transferred to a Macintosh computer for formatting and printing.

Dedicated Word Processors

(\$500–\$600)

These electric typewriter-like devices are equipped with a 7- or 14-line screen display and temporary storage memory which allows the user to store, retrieve, and edit a document before printing it out from the word processor. Many have built-in spellcheckers, dictionaries, and thesauruses. Some word processors, like the Portable Daisy Wheel Word Processor™ by Brother®, also provide a DOS compatible disk drive so that files can be saved and transferred to a computer.

Portable Computers

There is a broad continuum of portable computers currently available. More detailed information that can help guide buyers with purchasing decisions is available on NCIPnet.

Laptops or Notebooks

(\$1,400–\$7,000)

The terms laptop computers and notebook computers are used interchangeably to describe small full-featured computers that weigh under eight pounds, like the Toshiba 3950™ and the portables in the Apple PowerBook™ series.

Sub-Notebooks

(\$2,500–\$4,000)

These computers, like those in Apple’s PowerBook Duo™ series, are smaller and lighter than traditional laptops. While only weighing between four and seven pounds, they can also be expanded into complete desktop systems.

Portable Computers Adapted for Wheelchair Use

(\$6,000 and up)

These portables, with many or all the features of desktop computers, are specially designed to be mounted on a power wheelchair. The Synergy PC™ computer system, for example, houses the body of the computer in a case that is attached to the back of a wheelchair and can be hooked into the wheelchair battery. The LCD display is separate from the computer and can be mounted in front of the user. Speech synthesizers, switches, environmental controls, and other adaptive devices can also be added to these systems.

Additional Resources

More about Using Laptops on NCIPnet

- In-depth information on various types and features of portable computers
- Information to help you determine which type of portable computer best meets your needs
- Descriptions of other students, classes, and schools using laptops
- Vignettes of students with disabilities using laptops
- Additional tips on managing laptop use in schools and at home
- On-line support and assistance from teachers, specialists, and administrators
- On-line discussion events featuring teachers and researchers exploring innovative uses of laptops

Be an active member of the NCIPnet Community!

Log on to NCIPnet and:

- Ask colleagues questions about using laptops
- Ask colleagues questions about the features and capabilities of different laptops
- Share your experiences – success and problems – managing laptop use
- Describe your reactions to different products



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