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ABSTRACT

One of nine brief guides for special educators on using computer technology, this guide focuses on the use of computers to improve skills and attitudes in writing instruction. Pre-writing tools such as group brainstorming, story webs, free-writing, journal entries, and prewriting guides help generate ideas and can be carried out either on or off the computer. Frequent journal or free-writing time on the computer, exploration of graphics, and use of the computer as a collaborative writing tool are recommended as powerful ways to stimulate students' interest. Suggestions for using the computer as a revising tool include focusing on one aspect of writing per pass through the text and printing out subsequent drafts. The use of word processing editing features as well as special software programs to support the editing process such as text analysis programs and spelling checkers are discussed. Guidelines for selecting hardware and software cover various adaptive input and output devices and design features of writing software such as embedded spelling checkers and screen prompts or icons. Basic machine and keyboard skills necessary for word processing are identified. Student writing on the computer three times per week is encouraged. Listed are 10 recommended readings, 3 computer-supported writing process curriculum materials, 3 organizational resources, 6 periodicals, and 10 writing software packages. (DB)

Center for Special Education Technology

Tech Use Guide

Using Computer Technology

Computers and Writing

Derek, an outgoing eighth grade boy, writes "Anger is hard writing." His journal contains only lists of words, and he rarely goes beyond a few sentences in his other class writing. Collaboratively writing a series of round robin stories on the computer with three other boys and his teacher, Derek finally becomes excited about writing. He moves from trying to kill off the main character as quickly as possible, to adding details and plot twists to keep the story going. This writing isn't "hard" and "angry," but lots of fun!

Nan loves to write, but her poor spelling makes it difficult to read her writing, and editing is a time-consuming chore. When Nan's fourth-grade class starts writing on computers, she learns how to use a spelling checker and is thrilled at how much easier it is to correct her spelling errors.

Writing is a struggle for Brian, an 18-year-old in a wheel chair who reads on a third-grade level. Because Brian loves working on the computer and particularly enjoys the graphics capabilities, his teacher introduces him to the *Walt Disney Comic Strip Maker*. Using a mouse and standard keyboard, Brian selects a cartoon and types in a speech balloon to accompany each frame. The result is a professional looking comic strip that he proudly prints out and shares with his class.

As these three scenarios show, the computer can be a powerful writing tool. The challenge is harnessing that power to support the writing development and communication of students with disabilities. For each of these students, the computer, in combination with good writing instruction, had a positive impact on their writing and self-perception of themselves as writers.

The Computer as a Generating Tool

Some students have great difficulty getting started on their writing or quickly run out of ideas. Others simply get bogged down in the laborious process of handwriting. The computer enables students to enter text that is clear and legible on the screen, make changes without the chore of recopying, and print out professional looking writing. There's no pressure to produce a "perfect first draft" because it's easy to get rid of errors or unwanted text with a few keystrokes, or go back later and expand without recopying. Perhaps most importantly, students can develop a writing assignment over time, getting feedback and help along the way.

Pre-writing tools such as group brainstorming, story webs, free-writing, journal entries, and pre-writing guides all help students get past the "I don't know what (or how) to say" block and can be carried out either on or off the computer. Frequent journal or free-writing time on the computer gives students the freedom to explore topics on their own without the constraints of conventional writing. Before they know it, students have a treasure chest of ideas to spark further writing. Teachers can create prewriting templates with individualized prompts and questions, or write comments on students' text files.

Some word processing and supplementary writing software programs are designed to help students discover what they want to say and organize their thoughts (e.g., *Success with Writing*; *The Writing Adventure*; *Writer's Helper*; and *Think and Learn*). Options include outlining, brainstorming, freewriting, writing notes on 'notecards' and/or responding to a series of questions or prompts (i.e., What does your main character look like? Who is your audience? What do you want the reader to do after reading your complaint letter?, etc). In some cases, the prewriting can be printed in outline form or even downloaded into the word processing program to be used during composing. These programs are more appropriate for older or advanced students, but some can be adapted by limiting the number of questions, adding a new set of prompts, and the like.

Computer graphics have a powerful appeal for students of all ages and abilities. Students get hooked on writing and the power of communication as they write and illustrate stories, poetry, reports, advertisements, greeting cards, or cartoons. Graphics software ranges from open-ended drawing programs (e.g., *Dazzle Draw* and *SuperPaint*), to visual databases (e.g., *The Print Shop*), to integrated writing, graphics, and animation programs (e.g., *Explore-A-Story/Explore a Science* series, *Read, Write and Publish*, *Bank Street StoryBook*, *Create with Garfield*, *Walt Disney Comic Strip Maker*), to hypermedia programs that link writing, graphics, music, animation, and interactive videodisc (e.g., *HyperCard* and *HyperStudio*). Students also enjoy dramatizing their writing with the specialized fonts and type styles of some word processors (e.g., *Magic Slate* and *MacWrite*).

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While some students enjoy the freedom of a drawing program like *Dazzle Draw*, others prefer programs like the *Explore-A-Science* program on the desert, in which students playfully explore a series of scenes illustrating desert life, animating characters, reading notes, etc. They construct their own scenes, using a variety of backgrounds, objects, and animals and typing in their story or report to go along with it.

Another powerful way to stimulate students' interest and writing development is to use the computer as a collaborative writing tool. The public nature of writing on computers invites interaction as teachers and students read each other's screens and talk about their writing. Computer dialoguing (i.e., two partners converse on-line about a selected topic or in response to a question or conflict) and round robin stories draw students into writing to communicate and encourage a playful experimentation with language and form. Collaborative writing can go beyond the classroom walls when students in different parts of the country write and publish a newspaper, using a modem and software such as *Newsroom*, to send stories, articles, and graphics across telephone wires.

The Computer as a Revising Tool

Because the process of revision—stepping back and "reseeing" your writing—often results in the generation of new ideas and directions, revising and generating are closely linked. Revising also involves identifying and resolving problem areas that interfere with the writer's intended message, such as poor organization or lack of detail. Many students with disabilities are at a loss when asked to revise. Unsure of how to strengthen their writing or disheartened by what can be a difficult process with pen and paper, students often limit their revision changes to minor editing corrections.

The computer and software revising programs can support the revising process in a number of ways:

- Text can be easily inserted where elaboration is needed and erased where it's extraneous.
- The block move feature can quickly reorganize sentences, paragraphs, or longer text sections.
- Revision can focus on one aspect of writing per pass through the text, e.g., one pass for descriptive detail, one for dialogue, and so on.
- Each draft can be printed out and saved to show student progress.

Revision prompting and/or text analysis software programs can also aid the revision process. Examples of these programs include *Success with Writing*, *Writer's Helper*, *The Writing Adventure*, and *Mac Proof*. Features include:

- Questions or prompts, e.g., Is this point clear? Could you add an example?
- Number of words written, average sentence length, and other "statistical" data.
- Highlighting of specific usages such as passive voice, overused words, sexist language, and transitions.
- Print out of first and last sentence of each paragraph.
- Numbering and print out of each sentence.

Simply making computer revising tools available to students will not result in better writing! Students need to learn **how** to use these tools to accomplish their own writing goals. For example, the Block Erase feature is only helpful if students understand why extraneous information interferes with the writer's message, and they have a strategy for identifying irrelevant text in their own writing. It's also essential that students have multiple opportunities to share their work and get individualized feedback from peers and teachers during this revising process.

The Computer as an Editing Tool

Many students, and especially those with learning disabilities, have tremendous difficulty with the mechanics of writing: spelling, punctuation, capitalization, and grammar. Some students avoid the overwhelming task of correcting all their errors, while others become so concerned with accuracy that their writing fluency suffers. The computer can transform the editing process, making it possible for students to edit incrementally without laborious recopying, to separate editing tasks from composing and revising, and to use a spelling or grammar checker to find and correct errors. The search and replace feature of most word processors can be used to find potential problems, such as a misused word or spelling error.

In addition to word processing editing features, there are software programs designed to support the editing process such as text analysis programs and spelling checkers. While still fairly limited in capability, some programs check grammar, capitalization, and/or punctuation, highlighting potential errors and sometimes offering helpful information (e.g., *Writer's Helper*, *The Writing Adventure*). A spelling checker program compares each word in the text to a list of words in the program dictionary. It identifies words that don't match the dictionary's words, often highlighting the word in context. Most programs offer a list of suggested spellings for the writer to review and either select the correction from the list or type in his own correction. The correction is then automatically inserted in the text. Some spelling checkers are embedded in the word processor and can be accessed while composing (i.e., Bank Street Writer III, MacWrite 5.0); others are stand alone programs that can be used with texts produced on a variety of word processors (i.e., Webster's Dictionary, Sensible Speller). Most programs allow the user to add his own words to the dictionary and some will print out a list of the potential misspellings.

However, spelling checkers are not perfect editing tools. First, they miss many misspellings, such as a grammar error (he run for he ran), a real word substitution (bat for boat) or a homonym confusion (to for too). Second, spelling checkers may mistakenly identify correct words as potential errors, such as proper nouns, unusual words, slang, and abbreviations. And third, they are not always able to offer the correction, particularly if the misspelling is very discrepant from the intended word. Students need to learn how to operate a spelling checker effectively and develop strategies to compensate for its limitations, such as using a peer editor to correct errors the spelling checker misses.

Students will need instruction in the basic writing skills involved and in how to use the editing software to its best advantage. Teachers can monitor individual progress and target specific skills for instruction. As students learn new skills and apply them in their own writing, they can gradually increase their editing responsibilities.

It's important not to let the relative ease of editing overshadow the more important work of writing—developing and communicating ideas and feelings. Fixing up errors is a separate task that can take place once the drafting is complete, or at different points during composing. For example, some students like to spend the last few minutes of each computer writing session editing their spelling errors with a spelling checker, others like to edit prior to a writing conference to improve the readability of their text.

Getting Started: Selecting Hardware and Software

While writing can be accomplished on any personal computer with a word processing program, you may want to purchase or upgrade your computer(s) to 128k so that you can use some of the more sophisticated writing and graphics programs. A printer is also a must.

Choice of additional hardware, such as a mouse, a speech synthesizer, or a modem, depends on individual needs, writing goals, and software requirements. For example, a mouse makes it easier to use drawing and graphics programs and is needed to operate some word processing programs. A speech synthesizer such as the Echo II can be used with some word processing programs to read aloud students' writing at the letter, word, and sentence levels. This auditory feedback during the writing process is particularly helpful to very young writers with more severe language programs, and writers who are visually impaired. A modem is a telecommunications device that allows individuals to communicate with each other on the computer via a telephone hook-up. Students can send messages via electronic bulletin boards and mail bags, write and publish a newspaper in collaboration with students in another part of the country, or construct and analyze a collaborative database.

Students with physical or sensory disabilities may require more sophisticated adaptive input and output devices (e.g., adapted keyboard, head wand, touch screen, speech recognition, and braille writer, etc.). Given the sensitive match between the individual's needs and the technology, it's best to consult with school and state personnel who specialize in this area. Most states have technology resource centers for parents, teachers and children to visit and try out various options.

Writing Software

There are numerous word processing programs on the market today, including several designed for school use. While some are geared to specific grade/ability levels (e.g., *My Words* for Younger Students; *Success with Writing* for Junior/Senior High School), others may be used across a span of grades (e.g., *Bank Street Writer III, Magic Slate*). Some design features to consider when selecting a program include:

- Screen prompts or icons to help students use file management and editing features.
- Variability in the size of print on the screen display and printout.
- Embedded spelling checker.
- Speech synthesis capability.
- Integrated writing, database and spreadsheet programs.
- Integrated reading, writing and graphics programs.
- Integrated pre-writing, composing, and revising prompts and text analysis.

After analyzing the needs of your students and writing goals, order a trial copy of the software. Most publishers allow a 30-day period of examination. Avoid word processing programs that require mode switching for composing and editing (such as the early versions of *Bank Street Writer*).

Although a good word processing program is the only necessity, a drawing program, an integrated writing and graphics program and a spelling checker are all worthwhile investments.

Machine Skills Competence: A Prerequisite for Success

Students using a standard keyboard and word processor must become familiar with the keyboard and learn the basic word processing functions if the computer is to be a fluent writing tool. Choose a keyboarding program that builds skills incrementally and monitors individual progress so that students can proceed at their own rate (*Stickybear Typing, Type to Learn*). Frequent, short typing sessions are preferable (i.e., two or three 10 minute sessions per week versus one 30-minute session). It's important that students learn the basic file management and editing functions of the word processor. They should know how to open, save and retrieve a file and to move the cursor, insert and delete

letters/words/text. It's best to learn these basic skills before any extensive writing is done on the computer, using either the lessons included in many school-based word processing programs or teacher designed lessons. Once students have mastered these skills, they can be awarded a special "word processing license." The more advanced features of the word processor, such as block move and special formatting, can be taught as the need arises. It's also helpful to post large wall charts with the file management and editing functions near the computer for reference.

Writing Time

Ideally, students should write on the computer three times per week, composing, revising and editing their work. The computer will have limited effect on writing development if used only occasionally or primarily as an editing machine. If resources are limited, use the computer for collaborative writing and special writing projects.

These are exciting times for teachers and students learning to write on computers. The technology, combined with good writing instruction and careful ongoing assessment of students' needs, can open the world of written communication to special needs learners—and make writing challenging and fun in the process!

Readings

Daiute, C. (1985). *Writing and Computers*. Reading, MA: Addison-Wesley Publishing Co.

Dalton, B., Winbury, N., & Morocco, C.C. "If you could just push a button": Two fourth-grade learning disabled students learn to use a spelling checker. The EDC Writing Project, Education Development Center, Inc., Newton, MA. Manuscript submitted for publication.

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Graham, S., & MacArthur, C. (1988). Improving learning disabled students' skills at revising essays produced on a word processor: Self-instructional strategy training. *Journal of Special Education*, 22, 133-52.

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Riel, M. (1985). The computer chronicles newswire: A functional learning environment for acquiring literacy skills. *Journal of Educational Computing Research*, 1,(3), 317-335.

Rosegrant, T.J. (1988). Talking word processors for the early grades. In Hoot, J.L. (Ed.), *Writing with Computers in the Early Grades*. New York: Teachers College, Columbia University.

Computer-Supported Writing Process Curriculum Materials

Morocco, C.C., Neuman, S., Cushman, H., Packard, D., and Neale, A. (1987). *"I know what to say!": Writing activities for the magical writing machine*. Curriculum, The EDC Writing Project, Education Development Center, Inc., Newton, MA.

Writers at Work: Integrated Writing Experiences for Upper Elementary Grades (tentative title). To be published in 1990. Chicago, IL: Science Research Associates.

Resources

Council for Exceptional Children, Technology and Media Division, 1920 Association Drive, Reston, VA 22091.

The National Council for the Teaching of English, 1111 Kenyon Road, Urbana, IL 61801.

The National Writing Project, 5627 Tolman Hall, School of Education, University of California, Berkeley, CA 94720 (contact for state/local chapter information).

Periodicals

Computers and Composition, Dept. of English, Colorado State University, Fort Collins, CO 80523.

The Computing Teacher, University of Oregon, 1787 Agate Street, Eugene, OR 97403.

Exceptional Children, a publication of the Council for Exceptional Children, 1920 Association Drive, Reston, VA 22091.

The Journal of Learning Disabilities, 5341 Industrial Oaks Boulevard, Austin, TX 78735-8809.

The Macintosh Lab Monitor, P.O. Box 1386, Litchfield, CT 06759.

Special Times Catalog, Cambridge Development Laboratory, 214 3rd Avenue, Waltham, MA 02154. Available free of charge.

Writing Software

Dazzel Draw, School Edition: The Print Shop; Broderbund Software, 17 Paul Drive. San Rafael, CA 94903-2101; 415-492-3200.

Writer's Helper Stage II; CONDUIT, University of Iowa, Oakdale Campus, Iowa City, IA 52242; 319-335-4100.

Think and Learn; Explore-A-Series; Explore-A-Story/Science; Explore-A-Classics/Folktale, Read, Write and Publish; D.C. Heath/W.K. Bradford, 125 Spring Street, Lexington, MA 02173.

The Writing Adventure; Create with Garfield; DLM Teaching Resources, One DLM Park, Allen, TX 75002; 800-527-4747.

My Words, Hartley Courseware, Inc., 133 Bridge Street, Diamondale, MI 48821; 517-646-6458.

Bank Street Story Book, Mindscape, 3444 Dundee Road, Northbrook, IL 60062; 800-221-9884.

Success with Writing; Walt Disney Comic Strip Maker; The Newsroom; Bank Street Writer III; Talking Text Writer; Scholastic, Inc., 730 Broadway. New York. NY 10003; 212-505-3000.

Sensible Speller, Sensible Software. 210 S. Woodward. #229, Birmingham, MI 48011; 313-258-5566.

Webster's New Word Spelling Dictionary. Simon and Schuster, 200 Old Tappan Road, Old Tappan, NJ 07675; 800-624-0023.

Magic Slate; Type to Learn, Sunburst, 39 Washington Avenue. Pleasantville. NY 10570; 914-769-5030.

Additional **Tech Use Guides** on the following topics are available from the Center upon request:

Guide for Teachers
Guide for Parents
Technology for Work, Home, and Leisure
Computer Access
Selecting Hardware
Preschool Children
Learning Disabilities
Hearing Impairments
Physical Disabilities
Visual Impairments
Telecommunication Networks
Augmentation Communication

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