Throughout the 1980s, a number of researchers looked at the impact of word processing on students' writing. The results of the research provided some encouragement to those convinced of the value of word processing. But the gains were small. In a review of 42 studies conducted between 1981 and 1988, Gail Hawisher (1989) found that the few consistent gains from word processing included positive attitudes toward writing with computers; fewer mechanical errors; and, for many students, longer pieces of writing. Hopes that word processing would do more, especially to help students improve the quality of their writing, were disappointed.

This body of research has led many in the field to the conclusion expressed, for example, by Dawn and Raymond Rodrigues (1989), that "Word-processing packages themselves do not teach students how to write and revise—but teachers can" (p. 15). In short, what is critical is how teachers choose to employ the technology in their classrooms and computer laboratories. As Cynthia Selfe said in 1985, "We can't continue to present our students with composing strategies designed for paper and pencil when we want them to experiment with the real power of the electronic pen" (p. 65).

In focusing on the technology alone, rather than on the interaction of the technology and instruction, most studies to date have not examined either new writing strategies or teaching designed to introduce such strategies. However, the research on word-processing
technologies does provide many insights into how both student and professional writers perceive the writing machine and how it interacts with their writing processes. These insights can help us to develop a new writing pedagogy that integrates word processing.

In this paper, I reconsider the ways in which writers have responded to the major features of the word-processing packages they have used in order to point the way toward overcoming the obstacles these packages can present and taking advantage of their potential benefits. In particular, I focus on the word-processing packages elimination of the need to recopy successive drafts, the division of text into screens of limited size, and the presentation of text both on the screen and in hard copy.

In suggesting ways that the most can be made of word processing in writing classrooms, I consider both advances in technology and strategies for learning and teaching. Because many, perhaps even most, students and teachers today are using less than state-of-the-art technology, I conclude by addressing some of the problems encountered by users of such technology. As Christina Haas (1989) has shown, even the most sophisticated technology requires writers to be aware of their own writing processes and of how the hardware and software potentially help and hinder them—and to adjust their writing processes accordingly. With other technology, students need to be particularly aware of the drawbacks as well as the benefits and be helped to take advantage of the latter and overcome the former.

My discussion relies largely on reports of a number of research studies between 1983 and 1989. In addition, I draw on the results of field tests of PRENTICE HALL COLLEGE WRITER, an integrated writing program, which I developed with colleagues at the Education Development Center.

Ease of Revision

Many of both the pluses and minuses of word processing stem from the same aspects of its operation. The most obvious benefit, of course, is the elimination of the need to recopy successive drafts. This feature accounts for much of the enthusiasm for word processing by both student and experienced writers—even those who otherwise find fault with the technology. A typical comment of a student newly introduced to word processing is, “You don’t have to recopy all the good stuff…” (Bridwell, Sirc, & Brooke, 1985, p. 181). However, the very same feature may discourage students from doing substantive revision because they don’t have the same opportunities to revise as they recopy. Colette Daiute (1983), for example, points out that “some writers have found
that they need to recopy in order to evaluate their texts critically" (p. 136).

As is the case with most of the other disadvantages of word processing that I will discuss, writers can compensate for the missed opportunities to revise. They must, however, become aware of the potential pitfall, and they must learn effective techniques for review and revision that can be carried out on the screen and with the help of printouts. Daiute (1986), for example, has effectively used on-line prompting to increase revision by junior high school students and also notes the value of conferencing to encourage students using word processing to interact more with their texts.

Moreover, students must have on-going access to the computer and sufficient time to adapt their styles of composing and revising to the new medium—something that wasn’t possible on many campuses in the past but is becoming increasingly feasible with the spread of microcomputers from computer labs to dormitory rooms. More research on long-term use of word processing by student writers is needed to determine how such adaptation occurs over time (Hawisher, 1989). Anecdotal evidence suggests that many adult writers initially uncomfortable with and resistant to the computer do adapt successfully over time. However, as Bridwell-Bowles, Johnson, and Brehe (1987) comment,

Adults who work at it hard enough (ourselves included) can make the transition with any system, but we may have to take special pains to encourage large-scale revision and risk-taking by students. (p. 104)

The reference to risk-taking points to another frequently cited benefit of the ease of revision while word processing, that is, a sense of freedom to experiment. The ephemeral nature of text on the computer screen, combined with access to commands that facilitate deletion, insertion, and rearrangement of text, makes some writers feel that they can afford pen and paper. Though deriving from the ease of revision, this sense of freedom to take risks can extend throughout the writing process, from planning and the earliest scribblings through final revisions.

The students studied by Bridwell, Sirc, and Brooke (1985), for example, said that writing on the screen gave them “the freedom to write down their ideas, knowing that if they could salvage anything from their early attempts, they would not have to retype it” (p. 176). These students also reported writing with the word-processing packages to discover what they had to say. Similarly, Rodrigues (1985) describes a basic writing student who reported that while word processing “he wasn’t afraid to express himself because he knew that he
could immediately delete any sentences which embarrassed him." (p. 338). Richard Collier (1984) found that word processing encouraged experimentation with language and speculates that it may, therefore, lead to greater intuitive understanding of the nuances of language. Selfe (1985), too, notes that students who adapted well to composing on the computer indicated that "they were more willing to experiment when they used the computer to compose" (p. 62).

Delores K. Schriner (1988), who looked at student writers' risk taking in revising, found that students using word processing did experiment more with higher-level revisions than students writing with pen and paper. The computer writers' risk-taking, however, did not yield improvements in the quality of their writing. Schriner concludes that

because students using word-processing packages are attempting riskier revisions while knowing little about the appropriateness of their choices, [it may be] that increased instruction in revision is necessary in writing classes where computers are used (p. 51)

Schriner's conclusion echoes earlier criticism by John Pufahl (1984) of Collier's failure to teach revision strategies to the students in his 1983 study who used word processing to revise.

Not all research confirms that word processing increases risk-taking. Jeanette Harris (1985), for example, reports that although her students said that the computer encouraged them to take more risks, she found no supporting evidence in their writing—especially with units of writing beyond the sentence level. The sense of freedom accorded by using word processing can also, in some cases, be problematic. Case (1985) quotes several professors in different disciplines who worry that the very ease and freedom permitted by using word processing may damage their scholarly writing by discouraging reflection and encouraging unnecessary revision. Several of the subjects in the study of experienced writers by Bridwell-Bowles, Johnson, and Brehe (1987) also report some uneasiness about the speed and ease of composing at the keyboard. One describes his word-processed writing disparagingly as "rush-writing," while another complains that his word-processed text is "sloppier" (p. 102). In another study of experienced and professional writers (Lutz, 1987), the subjects reported that with word-processing programs they not only wrote more freely but also planned less. The implication is that the technology may be encouraging people to write before they have thought sufficiently.

This survey of the research suggests that the negative aspects of the freedom and ease of writing with word processing tend to be cited by
older, more experienced writers, while student writers consistently view this freedom positively. This may be because the older writers have established, effective strategies and procedures for writing which word processing challenges. Also, unlike many student writers, they may not feel the need for help in just getting started on a writing task.

Some student writers also seem to be so sure that word processing should save them time and trouble that they are quite willing to abandon even well-established composing behaviors. Randall Nichols (1986), for example, describes a first-year college student who spent half of a paper-and-pen writing session making an outline but made no attempt to outline when word processing. When queried about this change in her procedure, she explained, “I guess it’s because of the computer—because you don’t need to make outlines or drafts or anything” (p. 88). She also indicated that she thought it would be difficult to outline on the computer. Although outlining is not necessarily the best way to plan a paper, there is no reason it cannot be done with a word-processing package, with or without a specific outlining function. As with other word-processing features, students need to be aware of both the positive and negative aspects of the freedom and ease of word processing and to be taught to exploit the technology’s strengths and overcome its weaknesses.

For example, one way instructors can encourage students to take advantage of a word-processing package’s potential to encourage risk-taking is to use popular exercises that require students to write for a period of time without backspacing, scrolling, or using editing commands; that have them write with the computer monitor turned off; or that have them exchange keyboards or monitors so that what they write appears on a partner’s screen (see, for example, Derrick, 1986). At the same time, as Schriner (1988) suggests, teachers need to help students develop the knowledge and skills they need to handle the results of their experiments.

Paul LeBlanc (1988), for example, describes a student who, using a typewriter, habitually revised as he produced text, never going back to reread or alter more than the last couple of sentences, and writing exactly the number of pages required. Because the computer allowed him to produce text more quickly and easily, while also de-emphasizing page demarcations, this student found himself taking less time to revise his writing as he produced it and losing track of his overall goal. Such a student may need particular help in adapting to the ease of computer composing and revising. LeBlanc (1988) in fact suggested ways the student could slow down his writing (for example, making numerous hard copies and reviewing them to force “mid-process
reflection," p. 39) and restore his page sense (changing the setting so that he was required to paginate manually). Likewise, the student tempted to abandon planning behaviors can be shown how to use word processing to make and organize lists and notes or to make and revise outlines. Such a student might also be directed to prewriting programs that can supplement word-processing programs.3

**Text on Screen**

Another aspect of word processing that is often mentioned in the research is the problem of access to one's text that results from its appearance on screen at a time. On most microcomputers, the writer can see only 20 to 24 lines of text at once. Moreover, depending on the word-processing program, it can be difficult or time-consuming either to scroll through an entire paper or to find a particular page (Haas & Hayes, 1986).4

This aspect of writing with word-processing packages is frequently cited as a problem, particularly in keeping the writer from maintaining a sense of the paper as a whole and from revising for overall organization and coherence. Haas and Hayes (1986) found that the loss of the sense of the text as a whole caused by the typical screen display particularly inhibits writers' ability to read their writing critically.5 The limited screen display can also make it difficult to plan text changes (Haas, 1989). In addition, although word processing makes it easier to correct lower-level errors, it makes it harder to detect them (Haas, 1989). Collier (1983) suggests that the inaccessibility of a writer's whole text leads to more disjointed writing. And Harris (1985) suggests that it may inhibit the recursiveness of the writing process.

Harris, too, however, points to the obvious solution to the problems caused by limited screen display: frequent generation of printouts. In fact, in their study of writers with extensive experience in word processing, Haas and Hayes (1986) found that all the subjects except one made extensive use of hard copy. The one exception was a writer who was using an advanced computer with a large screen and high resolution display. In a later study, Haas (1989) notes that most experienced users employ pen and paper, though to varying degrees.

Even if they have unlimited access to the computer (and many don't), there is no reason why student writers should feel that they must do all of their writing and revising on the computer. They should be encouraged to use printouts, and procedures for reviewing and planning revisions on hard copy should be taught and modeled. As Haas (1989) points out, most students lack the keen awareness of their own writing processes displayed by the experienced writers that she
Where Teaching Needs to Augment Word Processing

They, therefore, won't necessarily discover for themselves the need for hard copy or the best ways to use it. Many writers, for instance, use hard copy whenever they want to read over the entire text, as well as when they are planning a major reorganization of the text (which they then carry out on-line).

Students can also be taught on-screen techniques that facilitate the recovery of the sense of coherence. For example, the writer can examine just the beginning and end of each paragraph looking for relationships between paragraphs, the logical sequence of ideas, and appropriate use of transitions. This is especially easy with a word-processing program that permits cursor movement by paragraph. The search command can be employed to find particular passages and to locate all references in a paper to key terms. Some word-processing programs have a split screen capability that enables the writer to view two portions of a paper at the same time. Use of such techniques, in conjunction with periodic printouts, can overcome whatever difficulties are introduced by the segmentation of text into screens. Rodrigues and Rodrigues (1989) report that teachers are increasingly encouraging students to develop their own combinations of pencil-and-paper and computer writing strategies. This trend is heartening.

Moreover, even the drawback of the word processor's segmentation of writing into screens can be an asset in certain circumstances. Rodrigues (1985) reports that her basic writing students "seem to have profited from seeing only a portion of their text at a time on the monitor. After reading through the entire draft, students diligently focused on one change at a time . . ." (pp. 338-39). Some teachers of younger students have also found that the framing of a limited amount of text on the screen facilitates conferencing, making it easier to focus attention on the text a student is producing (C. C. Morocco, personal communication, May 2, 1990).

Ideally, of course, the technology would permit a writer to shift focus as necessary from displaying just a sentence or paragraph to showing several pages at a time. Such shifts in perspective are already possible on high-end machines. But even an affordable program like WORKBENCH, with an integrated outliner, allows writers to shift from viewing only outline headings—which can be linked to the document as section headings—to viewing the entire text screen by screen.

Text in Print

Two frequently cited advantages of word processing derive from its presentation of the writer's text in print, both on the screen and in readily available printouts. The first of these advantages is what I call
the “neatness factor.” Bridwell, Sirc, and Brooke (1985), in their study of college writers using WORDSTAR, suggest that the “polished look” of word-processed texts may provide positive reinforcement, motivating students to continue to revise their papers (p. 174). Collier (1984) likewise concludes that the neatness of word-processed text increases students’ confidence, motivation, and willingness to go on writing. Gail Womble (1985), in a case study of two high school writers, also reaches the same conclusion: “With clean and readable copy, writers are better able to continue on to the important business of revision. Problems with handwriting and illegibility are no longer obstacles” (p. 76).

But neatness can also have negative effects. Some students may assume that because a draft looks good, it is good. Rather than promoting revision, then, neatness may inhibit it (Collier, 1984). A related effect of the neatness of word-processed text for some students is to focus attention on surface-level features as opposed to logic and organization. Selfe (1985) quotes a student who says:

maybe the [computer] makes it look so good that you don't pay as much attention to the ideas... I like to write it out on paper first so that I can think about the logical ideas... Yes, hard copy fools you into proofreading too much. (p. 59)

Here again, students can be assisted to take advantage of the neatness offered by word processing without being seduced into a premature complacency with their effort or neglect of substantive problems in favor of surface editing. Awareness is again a key, along with opportunities for and instruction in revision beyond the surface level. In addition to using peer editing and revision checklists, instructors can model large-scale revision on screen. (Large screen displays or projection screens, if available, are ideal for this purpose.) This can be done using programs that have good “undo” functions, or that permit exiting a document without saving it in order to recover a previously saved version. Students can also be encouraged to use the block, move, and copy commands to experiment with different arrangements of textual elements.

A second benefit of the appearance of word-processed text in print is an increased sense of distance that some writers say makes it easier for them to assess more objectively what they have written. Collier (1983), for example, notes that several students found that the clarity of text printed on the screen “facilitated [their] contemplation of alternative revisions and reduced their tendency to become infatuated with their own texts” (p. 152). An ESL instructor at Harvard University who
tested an early version of PRENTICE HALL COLLEGE WRITER reported that when her students used the program, they felt less threatened by teacher criticism. Her comments seemed less personal because they were directed at print on the screen rather than at the students' handwriting on the page. A teacher in the Brookline (MA) Public Schools similarly reports that "the distance that the monitor creates between the writer and his words . . . helped students to look at their writing more objectively and listen to criticism less defensively" (Moran, 1985).

The appearance of printed text on a screen has also been shown to encourage discussion and promote student collaboration in reviewing and revising writing (Dickinson, 1986; Kurth, 1987; Selfe & Wahlstrom, 1986). The readability of the text and its public display contribute to this outcome. So, too, does the fact that the shortage of equipment in many classrooms and labs has often forced students to share computers. Research on the QUIL L writing program showed the influence of such aspects of classroom organization on collaboration in writing with a word-processing package (Bruce, Michaels, & Watson-Gegeo, 1985). Like other positive aspects of word processing, fulfilling the potential for increasing collaboration and cooperation depends a great deal on the development of effective teaching strategies (Hawisher, 1988). Recent research, such as that conducted by Colette Dalute and Bridget Dalton (1988, 1990), though not focused on the role of the computer, may suggest ways that teachers can foster effective collaboration in writing with computers—for example, by modeling ways that the computer can promote joint experimentation, questioning, and reflection.

Like other word-processing features, the greater objectivity inspired by printed text also has its down side. The very distance that helps writers to evaluate and improve what they have produced can be a detriment while they are engaged in composing. For many people, the physical act of setting pen to paper is an integral part of writing. Selfe (1985) quotes a student who feels strongly about this: "with a pencil and paper I'm touching the words. Also, they look like you wrote them, not like the machine wrote them" (p. 57). Many writers find that, over time, they can adapt to composing on the computer, and that the benefits overall outweigh such disadvantages. Some writers continue to prefer to draft on paper and then enter their drafts on disk so that they can use all of a program's capabilities for revision.

For a few writers, however, the distance created by the computer inhibits even revision. In her study focusing on the effects of word processing on revision, Harris (1985) quotes one student's reaction.
It's awfully hard for me to look at the screen and want to edit anything. My paper seems so far away, almost abstract. It's not concrete like when it sits on the table in front of me. I almost feel like it's too far away for me to work with.... There's something about not being able to use pen and pencil that changes everything. Typing a first draft into the thing somehow seems so final—as if it does not lend itself to change. (p. 327)

This comment suggests that this student was hindered by both effects of the appearance of her text on the screen: that is, both the alienation from her prose (the distancing effect) and the reluctance to change what appears perfect (the neatness effect).

It is also worth noting that the student who made the comment quoted above found the entire experience of word processing frustrating. I suspect that such reports of alienation from one's writing due to its appearance on the computer screen may come from writers who have found the computer software difficult to master. In fact, much of the research to date on student writers' use of computers has involved word-processing programs, whether on mainframe computers or microcomputers, that were not especially easy to learn or to use.

**Overcoming the Drawbacks of Existing Word-Processing Packages**

So long as such programs remain in use, students will need help in overcoming particular drawbacks of the word-processing programs they are using. For example, Collier (1984) notes that the word-processing commands in the program his students used seemed to encourage a focus on the smaller units of language. I have found that even some word-processing packages designed for educational use make it easier for writers to change the type font than to move a paragraph. Many word-processing packages also fail to permit the writer to move the cursor by, and to delete and restore, units meaningful to writers—especially the sentence and the paragraph. Moreover, many older programs, some of which are still widely used, required writers to learn a variety of complex keyboard commands and formatting codes, to reformat paragraphs on the screen each time they made a change, and to carry out various other procedures extraneous to the writing task.

Certainly, creative teachers can do, and have done, exciting things with programs such as **Applewriter** and **Wordstar**. As Deborah Holdstein and Tim Redman (1985) point out, however, despite students' enthusiasm for the technology, word-processing packages that place in the student's way numerous obstacles external to the writing process...
Where Teaching Needs to Augment Word Processing

may do more harm than good. Not only is much of the writing software in use today not state-of-the-art, but even more advanced programs may fail to meet students' needs because they were developed, not for writers and writing classrooms, but for office workers and offices. Such programs tend to be strong on features that aid in the presentation of final copy and weak on features that aid in planning, organizing, and reflecting on an evolving text (Kurland, 1990).

The greater access students have to more appropriately designed tools, the less students and instructors will have to struggle to accommodate the technology to the composition course's goals. However, software with features specifically geared to student writers and writing instruction may be slow in coming. As the developer of a program targeted specifically to the college composition market, I can testify to the obstacles of wide distribution of such innovations. In particular, as the market for word-processing packages has matured, any program that doesn't carry one of the "big names" (such as WORDPERFECT or MICROSOFT WORD) has difficulty gaining acceptance. Often, composition instructors don't even get to make their own program choices, which may be made campus-wide, often on the recommendation of the computer science department.

Nevertheless, features of hardware and software now available, though not specifically designed for writing instruction, can help to overcome some of the difficulties presented by the older generation of word-processing packages. (It is worth noting that such features mainly facilitate revision, not planning or composing.) Haas and Hayes (1986), for example, found that users' reading problems can be alleviated by larger screens with higher resolution. As noted earlier, programs with split screens and windows that allow writers to examine different parts of their document simultaneously can also help to restore a sense of the whole text. Another feature (also mentioned earlier) that can help to restore that sense is the capacity to present different views of a text—from outlines to several pages at a time. Software that facilitates moving around within a document—whether with simple keyboard commands or a mouse and scroll bar—and carrying out revising functions such as inserting, deleting, and moving text can make it easier for writers to revise on screen.

Of course, some aspects of word-processing packages that writers must adapt to will remain, despite the most advanced technology. Word-processing packages will continue to make low-level corrections easier and recopying unnecessary, for instance, and they will continue to display text in print on screens—with the attendant benefits as well as hazards.
Moreover, as I began this paper by saying, no word-processing package can actually teach students to write, or to revise. If we want students to take advantage of the potential of the technology, and to overcome its disadvantages, we have to integrate word-processing technologies into writing instruction. Students need to learn about the capabilities of word processing; they need guided practice in using those capabilities to carry out writing tasks; they need to see demonstrations of specific strategies, especially for planning and organizing and for substantive revision, that a word-processing package can facilitate; and they need to learn about the potential pitfalls and the ways to avoid them (for example, by generating frequent printouts to restore their sense of coherence and awareness of their own writing processes). They can then evolve their own ways of making the best use of the particular features of word processing at their disposal.

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Notes

1. The field tests of PRENTICE HALL COLLEGE WRITXR were conducted from 1985 to 1987 at Harvard University's summer English as a Second Language (ESL) program, Indiana State University and Lebanon Valley College.

2. Donald Case (1985), for example, found that the longer the professors in his survey had used word-processing packages, "the more likely they were to report improvements in both quantity and quality" (p. 320). Lillian Bridwell-Bowles, Parker Johnson, and Steven Brehe (1987) note that, following the end of their study of experienced writers new to word processing, one of their subjects, as well as one of the authors, became accustomed to "complete, on-screen composing," suggesting that over a longer period of time writers may adjust more completely to the technology (p. 104).
3. Research of on-line prompts for planning is so far inconclusive, but it is possible that long-term use of such prompts can help students to develop and use effective planning and composing strategies (Bonk & Reynolds, 1990).

4. This is a case in which an inherent characteristic of computers—the division of texts into screens—can be made more or less of a liability by the design of hardware and software.

5. This finding is confirmed by Lutz (1987), who reports that professional and experienced writers asked to edit someone else's writing on the computer felt especially constrained by the lack of the sense of the whole text.

References


Where Teaching Needs to Augment Word Processing


