DESKTOP PUBLISHING IN REMEDIAL LANGUAGE ARTS SETTINGS: LETTING THEM EAT CAKE

JOHN WILLINSKY AND SHANNON BRADLEY GREEN

When Marie Antoinette reputedly declared that if the peasants wanted for bread, let them eat cake, she may well have sealed her fate within the French Revolution. But what if she had, in this callous flippancy, hit on a useful educational principle? What if teachers offered those who, for example, seem to be wanting in basic literacy skills, who are, in short, not writing much in language classes, the chance to use desktop publishing technology to design, write and produce their own magazine? This let-them-eat-cake premise underwrote a research project which we carried out with 20 potential candidates for remedial programs in junior high school. They wrote as they had not before, although the transfer of these demonstrated skills to test situations was not what we had hoped.

The project was based on a decade of research on word processing which strongly suggested that word processing leads to more writing for students in the middle grades (Morton, Lindsay & Rioche, 1989) and the college level (Willinsky, 1989; Bernhardt, Edwards & Wojahn, 1989). We understood that the increased levels of revision that word processing led to were most likely at the sentence level, as a matter essentially of "tidying up" (Bridwell, Sirc, & Brooke, 1985). But this still seemed a step ahead for the

reluctant writers with whom we were planning to work. Equally promising have been Daiute's (1983) findings on increased planning, as well as to greater elaboration of ideas. So that in spite of work that might temper one's enthusiasm for the new writing technologies, such as Haas' (1989) finding that processing tended to inhibit the degree of high-level planning, we felt confident that if we could provide the support and technology, students who were at the bottom of their language arts classes would have the chance to see themselves for the first time as writers working on a writing project of some significance.

One of the key points in the research on word processing was the enhancement of the students' attitudes toward the activity. If the quality of writing had not been improved (Hawisher, 1986; Cross & Curey, 1984; Willinsky, 1989; with Etchison, 1985 the exception), studies had established the attitude gains by students writing on machines (Johnson, 1987; Kahn, 1988), and to revising (Schwartz, 1982). More specifically with "at risk" students, Frances Beebe (1989) used computers in a magazine project to raise self-esteem with economically disadvantaged, middle-grade students in Alaska; she reports on the development of leadership skills, expertise tutoring with some improvement in writing and design. Griffin and Cole (1988) found that low achievers enjoyed using a form of "rap" to communicate with other students which acted, in turn, as a starting point for their writing.

It is worth adding, given our choice of student to work with, Griffin and Cole discovered that a) "above-average" students received more individual computer time than "average" or weaker students, b) computers in the schools of the weaker students were being used for skill and drill CAI rather than "cognitive enrichment" (CSOS, 1983-84). Friedman and Kephart (1989) confirm that programmed learning is still being drawn upon in innovative programs for "at risk" students. The project described here is far more in the spirit of Daiute's (1989) research on "writing play" involving collaborative projects with word processing. It attempts to capitalize on the cooperative settings which have lead to an improved attitude toward education among low achievers (Hawkins, Doueck & Lishner, 1988).

PROJECT DESIGN

The project was set up to work with groups of 5 to 10 junior high school students that would meet twice weekly to cooperatively

plan, write, layout, and produce a teen magazine. It utilized the typical resources set aside for students having problems in language arts, either through pull-out programs or classroom visits by remedial teachers, with the addition of recent developments in desktop publishing.

To guide the students' writing for the magazine, we drew on the "inquiry-centered writing model" which Hillocks (1987) had found so effective in his substantial review of the research on writing instruction. Following this model, which combines elements of the writing process with a structured program of research, students were to select a genre from the sample of magazines we brought in and fashion their own topic which they would investigate from a variety of sources. They would also decide on the presentation and layout of the piece (as described in the following section). While writing is the primary activity in this project, we were attempting to build reading-writing connections for the students. The writing/publishing electronic environment was also intended to shift attention normally concentrated on the students' weaknesses in language to a project that would call on social, technical, and literary skills.

Although 20 students were selected to form three magazine groups, we also employed control and remedial groups giving us a total of 55 students from three junior high schools set in lower middle-class, urban neighborhoods. Fifteen of the students were already enrolled in remedial classes, while the other 40, who were randomly assigned to control and magazine groups, were selected by their teachers as "weak" in language arts and "reluctant" writers, while capable of profiting from additional support in reading and writing. The resulting distribution included 22 grade sevens, 13 grade eights and 20 grade nines, with 22 girls and 33 boys.

The students in the magazine group met in a computer lab equipped with enough Apple IIe's and GS's to allow each student to work on a machine. Of the 20 students, 16 had previously had some experience with computers. The second author of this paper, an experienced teacher at the junior high level, was the instructor-researcher for these sessions. She had been part of a pilot study of the project with two schools earlier in the year. Over the course of the 12 weeks, she guided the students through the development, drafting, and editing of a single article before coaching them in the laying out of their magazine pages using the desktop publishing software *Publish It*.

The students in the remedial group met with their regular resource teacher approximately twice a week for a structured program in reading and writing skill development during the entire course of the project. The control group received the regular language arts program. The magazine and remedial groups met during the language arts periods twice a week for 40 to 50 minutes a session over the course of 12 weeks.

A number of measures and methods of recording data were used to assess the impact of this alternative program. A deliberate effort was made to gather data on the study that spanned both qualitative and quantitative sources. *The Grade 6 English Language Arts Achievement Test* produced by Alberta Education (1988) was used as a pre-test/post-test instrument to measure the impact of this work on traditional classroom demonstrations of skills in reading and writing. The reading test used a multiple-choice format; the writing test which asked for a single piece of student writing was marked by a team of five teachers who had experience marking the grade six provincial tests; each paper was marked by two teachers on a five-part scale.

On the qualitative side, we worked exclusively with the magazine group. The students were interviewed with regard to their literacy and computer histories; they completed a number of attitude inventories on writing and schooling. The students' teachers were interviewed at the end of the study and six-month follow-up interviews were conducted with the students. In presenting the results of this study, we begin with the findings from the various means of assessment that we conducted and follow these with the unexpected lessons that we learned about what these writers were capable of through the process of writing for their magazine.

RESULTS

The provincial standardized tests revealed that the students were indeed "at risk" and in need of extra attention. These grade seven to nine students averaged 50% on the reading component, scoring 15 points lower than the average for the province's grade-six students (Alberta Education, 1988). As it turned out, over the course of the 14-week period during which the study was conducted, there was no significant change in the reading scores of any of the groups (Table 1).

TABLE 1
MEAN SCORES ON ALBERTA GRADE SIX ACHIEVEMENT READING AND
WRITING TEST FOR MAGAZINE-PUBLISHING, REMEDIAL EDUCATION,
AND LANGUAGE ARTS CONTROL GROUPS

	Pre-Test (Jan.)		Post-Test (May)	
READING	M	SD	M	SD
Magazine (n = 19)	13.7	3.3	12.9	51.1
Remedial (n = 10)	12.3	4.4	11.9	4.0
Control (n = 15)	13.4	5.0	12.4	4.3
WRITING				
Magazine	14.3	3.5	16.7	3.6
Remedial	14.7	2.9	14.6	2.9
Control	13.1	2.7	16.8	3.4

Note: Subjects of the magazine and control groups were randomly assigned from
a pool of "weak students" in language arts selected by their teachers. Students
in the remedial education group were already receiving additional assistance from
special resource teachers in the school. Each student's writing assignment was
marked by two teachers with experience marking the provincial exams and the
scores averaged.

On the writing component, students in the study fared a little
better. Although all three groups began the study below the pro-
vincial average of 62.5% for grade-six students, by the end of
the study, the control and magazine groups finished the year
demonstrating slight gains, with means in the area of 67%. (Fur-
ther analysis of co-variance revealed that the control group's gain
was not significantly greater than the magazine group's, but both
groups did significantly increase their scores in relation to the
relatively unchanged results obtained with the remedial class.)
Working on the magazine did not prove a boon to the students'
ability to write or read, as measured in formal test situations.

The assessment of attitude changes in this study was restricted
to the magazine group. Students were asked before and immedi-
ately after the project how they approached a writing assignment
(Table 2). The responses on the multiple-choice scale revealed
an increase in both the number of students who look forward to
the writing and the number who feel inadequate in the face of
such assignments. Although these are certainly mixed results, there
were no longer any students who reported a sense that they were
going to fail in such a situation.

TABLE 2
POST-TEST ATTITUDE TOWARD WRITING AMONG MAGAZINE GROUP

1. When you approach a writing assignment, do you approach it with:		
	Pre	Post
A. a sense of how much fun it would be	2	4
B. a sense you can't do very well	3	5
C. a conviction that you will fail	3	—
D. a feeling that you can do it OK	10	9
total	18	18

Other measures of attitude looked specifically at the students' response to computers and to working on the magazine (Table 3). All of the students reported that they would like to continue to use the computer to work on the assignments; "ease of use" was the most frequent reason given supporting this request, with some references made to writing better and preparation for the workplace. In responding to the specific project of the magazine, 84% stated that they would be willing to work on the magazine in their own time, a figure that fell off to 69% during the six-month follow-up survey. But in yet another, somewhat unconventional measure of their attitude toward their writing, all but one of the 16 students in the follow-up interview were able to tell us where their piece of writing was at home.

TABLE 3
POST-TEST AND SIX-MONTH FOLLOW-UP SURVEY QUESTIONS
WITH MAGAZINE GROUP

Post-Test

1. Would you like to continue using a word processor for writing assignments?

       Yes - 19   Comments: "Better marks"; "fun"; "more fun and it organizes easier (2)"; "easier" (4); "take me out of class"; "in the future it may help us"; "so I could learn how to write better"; "pretty soon everybody is going to use computers for everything and I might as well use them too"; "they are also easy to work with and make the work faster and easier."

      No - 0

2. Would you continue writing articles for a school magazine if it were on your own time?

      Yes - 16   Comments: "Give me something to think about"; "depends (2)"; "it gives you time to get everything together"; "to keep me interested and others also"; "if it was just like this assignment."

      No - 3   Comments: "Wouldn't really be a school magazine and we wouldn't be able to work together"; "rather play sports"; "don't like writing for other people"; "no time."

Six-Month Follow-up

      Yes - 11   Comments: "If I was given a lot of time—writing for publishing takes a lot of time"; "If I wanted to become a reporter, I'd know all about everything"; "It seemed I could really express myself—the things I wanted to write about"; "it helped me to get to know the people in my school better"; "it's kind of neat because you can put yourself in a writer's shoes, investigate."

      No - 3   Comments: "Unless it was during the homework room"; "I'd rather play sports."

3. Was there anything that you learned about writing during the project [completed six months ago] that you used this year in any of your classes? (answers fell into more than one category.)

    Punctuation - 3   Comments: "I know now where to put it because it was important in my own writing to get my message across"; "I learned to punctuate better."

    Organization - 7   Comments: "I learned how to introduce a piece of writing"; "I learned how to put order of events together well"; "my paragraphs are better."

    Expression - 3   Comments: "You showed how to express myself better and make my words stand out more"; "how to get an audience's attention."

    Nothing - 3   Comment: "I pretty well knew everything I had to do already."

If no claims can be made on the transfer of this improved interest in writing and word processing to an improvement in achievement in test situations, these expressions of interest can be taken as a promising starting point for further development of the students' achievements in literacy. In the follow-up interviews, 81% of the students reported that they had learned one thing or another about punctuation, organization and expression that they had used in their writing since the project (Table 3).

What has gone missing from these tables and percentages is what these students found in contributing to the magazine. The

process and product of the students' writing speaks to another story, in gathering their materials and thoughts, in writing draft after draft, and in laying out their work in the magazine. We can only provide a sense of these "results" by shifting to the observations based on field notes of the project's teacher-researcher on a) the development of one student's remarkable personal essay and b) the students' music- and opinion-survey articles.

FIELD OBSERVATIONS (Shannon Bradley Green)

I think it was his cold blue eyes that struck me the most when I first met Sam, or possibly it was the manic giggle that caught my attention. Or perhaps again it was his army fatigues which had the distinct odor of cigarette smoke about them. These characteristics, and the pent up energy I could feel emanating from Sam, gave me a feeling this would be a student with something to say.

Sam began with the various teen magazines I had brought in to gain a sense of the possibilities that this form presented. He was attracted by the "Thrasher" magazines, a monthly publication dedicated to the skateboarding subculture which has found its place in our schools. I asked him to find a piece which interested him and which we could use as a model for his story, layout and appeal to audience. He flipped through the magazine without pausing — he was anxious to get at the computer. Once at the keyboard, Sam started four different stories and then dumped them all with keen indifference preferring to fill the screen with patterns of repeated letters. The power of the machine was something he wanted to control and test, and the power was, in this case, causing a cascade of letters at the press of a finger. Sam had not used a word processor before, and I was willing to allow that he needed to get to know the machine on his own terms.

In the second session, he picked up the magazine that the students created during the pilot study for this project, *Pizzazz*, and he found a piece about why skateboards weren't allowed in the school—"Mr. Jefferson Says No." It was then that he said that he had a similar story to tell. What was interesting to us was that he took his cue from the most direct model, another student magazine, and that he had grasped a wider sense of what voice

and audience meant in writing by taking his lead from another student/writer. This was modeling.

Sam was in the process of going through an interesting event in his life that involved both the police and the justice system, and he felt he had a real story to tell his intended audience about the unfair attitudes of "cops" towards teens. He began to compose by brainstorming ideas and events, but the order of his story was so strongly set in his mind that he could not think in general terms, so he simply set down, in sequence, what happened. He began with the piece's principal argument:

> The attitude of teenagers toward police is getting worse everyday. More and more you hear frustrated teens complain about how cops always give them a hard time. Many of them say it is not fair the way cops treat teens. [Unchanged through ten drafts as the piece expands from 7 to 43 lines].

By the second session of writing, Sam had begun to fill out his thesis with his substantiating story:

> One night my friends and I were driving around and shooting at people with a pellet gun. We shot a guy and wife called the cops . . .

He developed the piece principally by elaborating on the details of his "crime," arrest and trial. He was wrestling with how much needs to be told to give the story both coherence and a hold on the reader:

> One night my friends and I were driving around. It was the first time that we had a car in a long time and we were wondering what to do . . . I could here the B.B. hit the mans vest as he sped away. For about two minutes I was in shock. I kept saying to myself, "Is this a dream?"

After each session, I was having him print a copy of his work, which I duly marked up with indecipherable comments on how to edit the work. But when I found that this was not helping Sam, I decided to build on a concept that Judith Newman (1988) had used with graduate students by adding comments to the end of the student's computer files. When my students retrieved their file each day, they found my editing and revision suggestions, as well as comments on the day's composing:

> Hi Sam! You're getting there, you're getting there! I need
> the ending today!! Then I need you to spell check this and
> print a copy of this draft so we can revise it, if necessary.
> Once the revisions are done, you're ready to start designing
> your article page. So get going!!

I was soon adding comments directly where Sam needed to edit.
Sam simply made his revision and deleted my comments when
he was done:

> They opened the door and one cop came in and took a
> picture of me, then left. (YOU'RE MISSING A SENTENCE
> HERE ABOUT HOW YOU GOT HOME.) Then the next
> day . . .

Half-way through the project Sam extended our ideas about the
possibilities of electronic communication. He picked through my
disks from one of the other schools until he found what was clearly
a female name on one of them. He started a "disk-to-disk" cor-
respondence over the next few sessions with a girl from the other
school, always carefully erasing her messages after reading them
at the end of his file, as she was to do with his at her school.
It suggested how we might well expand the range of literate ex-
change for these students.

When we agreed that he had finished the article, Sam again
played out the potential powers of this new technology by trying
out his article in a number of different fonts. I felt this was a natural
extension of the writing process, of really trying to reach an au-
dience. (Six months later, in the follow up interview, Sam said
that he enjoyed doing the article, but he added that "producing
it" was "the best part.") In laying out the article, he built in space
for a few complementing pictures, and decided to dramatize the
final two words of his concluding sentence by setting them in a
bold and larger typeface: "They have always given us a hard time
and they **always will**" (see appendix).

When it came to interviewing Sam's teacher about the im-
pact of the project, it was troubling to find that he observed no
change in Sam's performance in class and yet on seeing Sam's
piece, "Police vs. Teens," he observed, "That's great for him,
anything is great for him." That "anything" bothered me, too, as
Sam's piece was so much more than that, but the expectations
which Sam had negotiated with his teacher had clearly been set

at little more than nothing. The teacher went on to say that the magazine was "probably the best thing that ever happened to him" and that the students in the class when the magazine was distributed seemed to feel that Sam had "tapped into a truth." It spoke to our need to bring this project into a greater engagement in their language arts classes. It had clearly remained too isolated from the regular classroom.

In the interview at the project's end, Sam explained that when the project began he "didn't know how to write an article but I knew I would write one." He said he "felt free" to write about "the topic I chose" and that the computer was "a lot easier than pencil and paper because you don't have to re-write everything." Six months later, Sam recalled the importance of "the order of events" in writing—"I learned how to put them together well"— as well as emphasizing how students and family had liked his article, although his father had "lectured" him because he "thought I just wrote it to be cool."

Five students conducted surveys among their classmates— three gathered data on pop music, one on fashion and one on popularity—making it the most popular genre among the eighteen students. Linda's "Music '89" provides an excellent instance. She was a shy student and remained unusually quiet during the course of the project. But once she had hit on music as a common interest for herself and the other students, she felt no hesitation about going after their opinions. During the first session she developed an 11-item questionnaire on radio stations, concerts and favorite songs. She distributed the survey, made sure she had 100% return rate by going after students, and tabulated the results before turning the list of figures and titles into an article. The organization of the article was the big question and by using the teen magazines as models, she decided to add opening, middle and closing paragraphs to break up the lists. She used an opening hook—"What is the hottest music in '88/89?"—and she closed with a clincher—"I hope the results are interesting to you and will help you recognize some of the great music we have had over the year." The article spoke to student interest, but it also demonstrated the use of literacy as a way of reaching out to her classmates: "Working in a small group is easier," Linda wrote at the end of the project, "because you can contribute more and get involved."

One promising variation on this standard survey format was Michelle's "Teacher and Student Differences: An Insight into School Life" in which she asked teachers and students "what bugged them" about students and teachers respectively. She carefully balanced the different viewpoints of the two sides before arriving at a reconciliatory conclusion:

> Perhaps if we could just take into consideration that the teachers have a job to do educating us and that we make it difficult by being hard to get along with, then maybe we wouldn't get hassled so much. As well, if teachers wouldn't assume that we are guilty until proven innocent and realize that treating us with respect will get them a lot further than bullying us, then perhaps some peace could come to the education system, and both parties could enjoy school a lot more than they do now.

There is a pride evident in the prose, in getting it down right, in the balance of the sentences and the fairness of the views. It is this match of form and content that I tried to achieve with the students from the opening line to the final layout. It was enough to find at the end that, indeed, we had produced something more than we had imagined when we first got together to work on this project.

DISCUSSION

This project did not result in an appreciable test-score gain for the students in the magazine group. The improvement in their writing scores was matched by those in the control group; the gain of both the publishing and control groups over the remedial group is tempered by the selection procedures for that group, which insured that the remedial students were most in need of help. The claims of this project must remain modest. It provided a different orientation to writing, one which the students appeared to appreciate for its high technology and its productiveness. While the publishing project utilized the human resources of a typical remedial program, with its low pupil-teacher ratio, it does represent an alternative. The focus is on students writing for other students, rather than on skills and drills.

The slight increase in the sense of "writing anxiety" which we found in the magazine group concurs with the findings of an

earlier study by one of us conducted with grade-one students (Willinsky, 1987). The more writing which students do, it appears, the better they understand how much work is involved in getting ideas down on paper. In this study, too, the students were made to realize a number of new demands on the organization, editing and preparation of their work to make it suitable for publication.

The students in the magazine group, who had been judged by their teachers to be "reluctant writers," did gain an appreciation for writing on computers and working on a magazine. More than a few of them pointed out that computers were part of the future of writing, giving them a sense of participating in what lies ahead. Most of them expressed an interest in writing for other students, which we took as a sign that pointed to this method's promise as an instructional method in literacy. Equally important was the fact that these students produced work that clearly impressed their teachers, classmates and themselves. The students saw how writing can work on others. The follow-up interviews also make it apparent that the students did "learn" about elements that are important to improving writing, from punctuation to organization, even if we have no proof that they were actually writing better because of their work on the project.

In the area of reading, certainly, more work needs to be done in the design and delivery in programs such as this to connect the students' writing to reading activities. The students read principally to ascertain models for their own writing, but only rarely was the substance of what they were reading used to write a better article. There was also a need for a greater coordination with the regular school program. Only five out of fourteen teachers reported a change in the students' attitude toward language arts during the project, and this we attribute in part to a failure to have students connect with the work going in the classroom by involving their teachers in the project; similarly, the fact that only seven out of sixteen students reporting in the six-month follow-up that they had a chance to write again using a word processor suggested the need to make the advantages of this form of work better known to educators.

One final point should be made clear. The difference in what the students produced for the magazine, which was a noticeable improvement over their class work, and what they scored on the tests, which did not differ from their classmates in the control group, had not only to do with technology and teacher resources. It also

had to do with the simple matter of time. This was part of the luxury, an ingredient of Antoinette's cake, as the computer made it easier for the students to stay with the same piece of writing, improving it repeatedly without having tediously to recopy it. Students are rarely given such support, in sheer time, to work out something which they had chosen to say in such an attractive form. As a group, the students chosen for this project have little reputation for staying with school projects: "I can't believe," one student's teacher said, "he could stay on track throughout such a long piece."

Although we had occasionally to press them with deadlines as well, these students produced finished, polished pieces that often had something to say about their own lives, and they did it because they were given the time to learn something about computers and writing while working on their piece, because they were provided with resources, and because the instructional focus had shifted from the completion and evaluation of an assignment to the collaborative production of a cultural and literate artifact. We offered them the best which the school had to offer by way of resources for writing and the time with which to work on writing that was theirs, and it should really not be surprising that they stayed on track throughout such long pieces—it was, for them, a piece of cake. These students had a chance to learn new lessons about writing, in terms of technology, presentation, and reception. That in itself seems worth pursuing. Yet it remains for us to find ways of turning these lessons into long-term and transferable gains in their competence in writing and reading.

John Willinsky is director of The Center for The Study of Curriculum and Instruction at the University of British Columbia and is author of The Well-Tempered Tongue, The New Literary, and The Triumph of Literature. Shannon Bradley Green is a language arts specialist with specific interest in learning dysfunctions and has served as a research associate with the Canadian Center for Learning Systems in Calgary, Alberta. She is currently a teacher/consultant at Glenwood School in Langley, B.C. where she works with teachers designing curricular applications and instructional strategies for microcomputer technology. At the Center for Study in Curriculum and Instruction at the University of British Columbia, she is continuing her research into the effects of word processing and desktop publishing with special populations while passing an MA. The authors wish to thank the Calgary Board of Education, the Calgary Catholic Board of Education and The University of Calgary for funding the project and Graham Foster, Mary Frampton, Bill Washburn, and participating students and teachers for cooperating in the project.

WORKS CITED

Alberta Education. (1988). *Achievement testing program: Provincial report June 1988 administration*. Edmonton, AB: Alberta Education.

Beebe, Frances. (1989). Cooperative learning and self-esteem on the staff of the *Junior Lynx. Computing Teacher, 17*(3), 8-11.

Bernhardt, S. A., Edwards, P. & Wojahn, P. (1989). Teaching college composition with computers: A program evaluation. *Written Communication, 6*, 108-133.

Bridwell, L., Sirc, G. & Brook, R. (1985). Revising and computing: Case studies of student writers. In S. Freedman (Ed.), *The acquisition written language: Revision and response* (pp. 172-194). Norwood, NJ: Ablex.

Center for Social Organization of Schools (CSOS). (1983-84). *School use of microcomputers: Reports from a national survey* (Issues 1-6). Baltimore, MD: Johns Hopkins University Press.

Cross, J., & Curey, B. (1984). The effect of word processing on writing. Mid-Year Meeting of the American Society for Information Science, Bloomington, IN. (ERIC ED 247921).

Daiute, C. (1989). Play as thought: Thinking strategies of young writers. *Harvard Educational Review, 59*(1), 1-23.

Daiute, C. (1983). The computer as stylus and audience. *College Communication and Composition, 34*(2), 29-33.

Etchison, C. (1985). A comparative study of the quality of syntax of compositions by first year college students using handwriting and word processing (ERIC ED 282215).

Friedman, J. E., & Kephart, D. (1989). Pull-in, reach out: Successfully integrating technology for at risk students. *Computing Teacher, 17*(3), 12-15.

Griffin, P., & Cole, M. (1988). New technologies, basic skills and the underside of education: What's to be done. In J. A. Langer (Ed.), *Language, literacy and culture: Issues of society and schooling* (pp. 199-231). Norwood, NJ: Ablex.

Haas, C. (1989). How the writing medium shapes the writing process: Effects of word processing on planning. *Research on the Teaching of English, 23*(2), 181-207.

Hawkins, J. D., Doueck, J. J., & Lishner, D. M. (1988). Changing teaching practices in mainstream classrooms to improve boning and behavior of low achievers. *American Educational Research Journal, 25*(1), 31-50.

Hawisher, G. (1986). The effects of word processing on the revision strategies of college students. Annual meeting of the American Educational Research Association, San Francisco (ERIC ED 268546).

Hillocks, G. Jr. (1987). *Research on written composition*. Urbana, IL: NRCE.

Johnson, V. M. (1987). Attitudes toward microcomputers in learning. *Educational Technology, 29*, 47-55.

Kahn, J. L. (1988). Learning to write with a new tool: A study in emergent writers using word processing. *Dissertations Abstracts, 49*, 06A. (University Microfilms No. 88-16, 133).

Morton, L. L., Lindsay, P. H., & Roche, W. M. (1989). Word Processing effects on writing productivity and revision at elementary and junior high school levels. *Alberta Journal of Educational Research, 35*(2), 145-163.

Newman, J. (1988). Sharing journals: Conversational mirrors for seeing ourselves as learners, writers, and teachers. *English Education, 20*(3), 134-156.

Schwartz, M. (1982). Computers and the teaching of writing. *Educational Technology, 22*, 27-29.

Willinsky, J. (1989). When university students word process their assignments. *Computers in the Schools, 6*(½), 83-96.

Willinsky, J. (1987). As some children write more than others: The impact of learning to write on grade one students. *Alberta Journal of Educational Research, 33*(2), 115-122.