Fluency, Fluidity, and Word Processing

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Computers don't teach students to revise, teachers do.
Computers don't revise, students do.

Despite the above maxim, numerous studies have been conducted over the past five years to determine whether student compositions improve significantly with the use of a computer. As Gail Hawisher (summarizing Seymour Papert) suggests, our field is so new that we seem to be in a technocentric phase comparable to the egocentric phase through which Piaget's children must pass on the way to maturity. We are searching for "THE effect" of the computer on the product (the text) rather than "the effects" of the computer both on the writer and on the context in which the product is produced ("Research and Recommendations" 44-45). We have already passed judgment on what the computer should do (improve the product) rather than investigate what it does do. Thus, the results of the studies conducted to date appear contradictory.

When the overall quality of students' texts is compared, results of most comparative studies, regardless of the participants' grade level or writing proficiency, fail to indicate significant differences between students using word processors and students using pen and paper (Daiute; Haas and Hayes; Hawisher). However, studies concerned with the processes involved in composition rather than with the final product have indicated that differences do exist between writers using pen and paper and writers using a word processor. These studies span grade levels and range from basic to professional writers. Some of these latter findings may well explain these contradictory findings.

Hawisher, in summarizing research results to date, found that significant increases in text seemed to be the "most agreed upon finding" ("Research Update" 11). James Catano found that the word processor provided two novelists with increased capability in terms of fluidity in working with their texts. Colette Daiute's studies of student writers indicate that those who use a word processor expand their texts more than those who use pen and pencil. Christina Haas' results substantiate these findings. She found that students spent more time and produced more words at an advanced workstation than they did with pen and paper. Finally, recent findings by Craig Etchison, which support the findings of J. Nash and L. Schwartz, indicate a significant increase
in the production of text by basic writers using word-processing software.

If, as these results seem to suggest, a word processor may help students write more fluently and fluidly, then why doesn't the overall quality of their compositions improve significantly? Muriel Harris' recent research may begin to provide an answer. She found "multi-drafters" were more fluent and creative than "one-drafters" but that they had difficulty achieving a focus. Thus, one might infer that though students are becoming more fluid and fluent, they are failing to organize their ideas and to develop a focus. Gerald Grow comments that "word-inflation multiplies" with the computer as unfocused writers devise dozens of ways of coming close to saying what they mean without ever saying it. He suggests that "computers seem to tempt people to substitute writing for thinking" which results in "unfocused" texts (219, 217).

To investigate the effects of word processors on students' compositions further, the English Department at Illinois State University (ISU) conducted a survey of all students enrolled in its computer-assisted first-year composition course. We hoped that students might reveal something that would help untangle these seemingly contradictory findings and bring to the surface further evidence of increased fluency and fluidity.

At first glance, our results seem to parallel those of the other studies. While students' perceptions of their use of the word processor indicate that they feel the computer helps them write better, their grades indicate otherwise. But upon further examination, we believe that students are increasing in fluidity and fluency while simultaneously failing to organize and focus their increased verbiage. We would like to suggest that because students lack the skills to control their new-found fluency and fluidity, their texts, when evaluated holistically, do not indicate significant improvement. Studies of the effects of word processing on composing, more than all of our previous discipline's research, seem to point up students' lack of skill in planning and revising their texts and in our inability to provide them with effective instruction in these skills.

The ISU Survey

All classrooms for first-year composition at ISU are equipped with Zenith microcomputers (an IBM clone) and a modified WordStar word processing program. Over 2,500 students per term enroll in these courses and over 60 faculty members provide the instruction. Of the approximately 5,000 students enrolled in both the fall and spring semesters of the academic year, approximately 50% (2,300) responded to questionnaires distributed during the final week of classes each term. Students could return the questionnaire either during class or to a drop box outside the classroom door.

One portion of the questionnaire was devoted to determining the amount of time students spend using the word processor. The results indicate that over half the students use computers on a daily basis in their
composition class. Outside of class, students are split about half and half, with only about half working on their texts throughout the week and the other half working on them the night before they are due, just as they have probably always done with pen and paper. Two-thirds spend no more than two days a week using the computer to work on their papers, and their average drafting session in a computer lab outside of class is only about one hour. Almost one half of the students admit to feeling it is a hassle to leave their dorm room to go to a computer lab to write, which may be the reason most of the students only go to the lab a few days a week. Most students (94%) like to print out hard copy often because they believe it is easier to proofread a typed draft than the monitor.

The questionnaire was also designed to determine the relationship between the amount of time students spend writing with the computer and the amount they used to spend with pen and pencil. The results indicate that while most students (80%) believe they save time using a word processor, less than a quarter spend the time they have saved on their writing. Most (41%) spend the time working on other subjects, while 17% admit using the time either to sleep or party. In addition, although they admit enjoying writing with the computer, only about half perceive themselves spending more time on their writing and revising.

The questionnaire further attempted to learn how the computer affected students' writing processes. While their responses indicate that they engage in all phases of the writing process, the students perceive themselves using the microcomputer mainly for revision rather than during the prewriting stage or during a first draft. About two-thirds of the students prefer to write the first draft with pen and paper and then revise on the computer. The majority (75%) estimate they engage in two to three rewrites per paper, which parallels the average number required by an instructor. The students are evenly split on their use of CorrectStar, with about half using the program.

Finally, the questionnaire investigated student perceptions of the quality of their writing on a computer in relation to the quality of their writing with pen and paper. About half the students perceive themselves writing better with the computer. However, in what would appear to be either a lack of confidence in their own evaluative abilities or a statement of their perceptions of the vagaries of teachers' grading systems, two-thirds of these students could not determine whether they would have had a higher grade had they used pen and paper.

The questionnaire did not seem to tell us anything we hadn't already suspected or previous research had not already confirmed. However, when students elaborated on their responses to the computer in journals or in in-class themes assigned by their instructors, we gained some insights into their perceptions. In these responses, they consistently noted how this facility in revision allowed them to be more creative, fluid and fluent, as Catano's two
novelists had found in their use of a word processor. One student commented, "When I use a word processor, I can let my creativity show and not have to worry about writer's cramp," while another explained, "I don't feel as pressured. If I have started something that really doesn't need to be in the paper, or I have misinterpreted something, I can easily get rid of it or turn things around so they make sense." A third suggested, "The computer allows you to just type in thoughts as they pop into your head without thinking about what the sentence structure is or if it sounds correct. Revisions are so easy that sentence structure and spelling can be looked at and corrected later."

Furthermore, students indicated in these elaborated responses that they were engaging in macro as well as surface types of revision. They noted that they were inserting, deleting, and moving information for units as large as a paragraph. In addition, students emphasized how the computer's ability to facilitate revision saved them time: "Much more can be achieved in two hours of working on the computer than can be done in two hours when writing with pen and paper." They also noted the computer's ability to turn out a clean copy: "Not only is a paper easier to read than someone's handwriting, it also looks much nicer."

At times, however, students' perceptions of the computer's capability to facilitate the revision process and to create clean copy endowed the computer with mythical properties: "Since the word processor types the paper out for you, the chance of a typing error is less than that of a conventional typewriter." Said one student, "Writing a rough draft can be done in a matter of minutes."

The Prototypical Student Writer

If, as students indicate, they are writing more creatively and fluently and engaging in macro as well as micro revisions, then it would seem that their papers should show significant improvement. This is not happening. Overall GPA for students using word processors has not increased significantly since students began using them. The failure of students' composition grades to improve appears to support the research studies of Daiute, Haas and Hayes, and Hawisher, who found no significant improvement in compositions of students who used word processors over students who used pen and pencil.

To understand why improvement does not appear to be occurring, we need to look beyond the surface. Combining the results of the questionnaire with the elaborated responses, we created a profile of Thomas Tech, a prototypical student enrolled in a first-year composition course. The profile provides several clues in understanding why students' compositions do not improve.

During his composition class, Thomas Tech uses the word processor to engage in a prewriting activity for an assigned essay. During this time he writes fluently, allowing his ideas to flow on the screen, adding ideas as they arise. Before leaving class he prints out a hard copy. Back in his dorm room,
Thomas uses pen and paper to finish drafting the essay. He then spends about an hour one evening at one of the computer labs, typing the rest of the paper onto his data diskette so it will be ready for peer group conferencing. He makes several small changes to the text while he is doing this. Once the paper is printed, he returns to his dorm to study chemistry. He returns to the computer lab two additional nights for about an hour each time to work on the revisions suggested during the peer conferencing session. As he makes changes on the paper, he continually prints out hard copy to reread his work and to see how it looks. Because he was caught with a lot of spelling errors on his last paper, this time he uses CorrectStar. When he thinks his paper looks good, he prints out a final copy and departs for a party.

**Fluidity and Fluency**

In following this prototypical student through the writing of a paper, we can begin to understand why the research doesn't indicate significant changes in student writing with a PC. The word processor may, by affecting students' fluidity, have exacerbated a situation which, as Linda Flower points out, has always existed. Flower's research indicates that often even students who do not use word processors are unable to engage in successful replanning. Yet, replanning becomes even more complicated with an increase in length, fluidity and creativity. If, as R. Nichols suggests, writers simply use the computer to do more of the same, then it seems apparent that students may know they need to move the chunks around but, because they have no heuristics for determining exactly where the chunks go, their moves, eased considerably by the word processor, are haphazard and do not result in an improved organizational structure of the text. As Paul LeBlanc notes, "Giving students an easier way to rearrange text and removing the penalty of retyping clean drafts will not result in significant revising behavior if the student cannot imagine an alternative text" (35).

Nancy Sommers has previously reported that often students feel that something needs to be done but they don't know what. Students' inability to deal with a large, disorganized mass of information may also be one reason both Fred Kemp and C.H. Kline found in their research that prompts, by providing strategies for organizing chaos, created significant improvement in students' compositions. It may also explain Aviva Freeman's results, which indicate that students who draft first with pen and paper write better quality texts than students who use computers.

In addition, the time needed for determining strategies to solve the problems associated with these longer and less organized drafts may need to increase. Lillian Bridwell and Ann Duin emphasize the importance of time in relation to the work experienced writers do on computers, noting it takes time to "plan on the screen, to read, to print and mark up hard copy, to write and rewrite, to revise and edit" (119). Many of the respondents to the ISU survey indicate that they spend more time writing with the computer, and
Timothy Weiss' study also indicates that students using a computer spend more time working on their writing than students using pen and paper. If these students are truly spending more time, then why don't their texts show improvement? It would appear that the question of how that time is spent needs to be investigated. (Carole McAllister and Richard Louth also raise this question.) If the additional time is spent in ineffective revision, then it becomes irrelevant.

Also, the way time is parcelled out may be a factor. The ISU survey indicates that students are only spending an average of one hour per session at the computer. It is doubtful that this is sufficient time to solve the problems often associated with an abundance of information. While there is no research to indicate the average time a good writer spends drafting and/or revising a typical student theme at a single sitting, an average of one hour per sitting appears insufficient. Hawisher suggests researchers might examine this question of time to determine whether there is a relationship between the amount of time spent on a text and increased error detection, as well as a relationship between the amount of time students devote to a writing task and error correction. They might also examine the kinds of time frames required by experienced or professional writers for drafting and/or revising various kinds of documents. Can this time frame be subdivided into many small periods, or are large chunks of time necessary? What is the average amount of time for drafting 500 words? If these chunks of time are interrupted or broken into smaller chunks of time, does the quality of the discourse decline?

Finally, adding to students' problems in dealing effectively with their new creativity and fluency may be a false sense of security which the computer has apparently instilled. Students appear to be victims of what one teacher has termed the "fairytale syndrome," a belief in the "miraculous power of the machines" which causes writing to appear and disappear magically and print to be arranged and rearranged. Christine Hult suggests ineffective "revising strategies may be heightened when students use text-analysis programs" (32). Lulled by this magical quality into believing that such programs as CorrectStar will correct all spelling errors and that the machine itself will somehow correct anything they miss, students continue to submit papers with spelling, punctuation, and grammatical errors.

Researchers need to conduct long-term studies to determine whether or not the effects of word processing on writers and writing will change over an extended period of time. We need to know whether students will eventually gain control of these fluent texts and whether they will outgrow the fairytale syndrome. As we delve further into the effects of computers on writers and writing over an extended period of time, we also need to investigate whether, given unlimited access to computers, the number of students who draft directly on the computer increases and whether the creativity and fluency of texts by these students changes significantly. Furthermore, we need to look
at whether once students become accustomed to drafting directly on a PC, they gain more control of their writing.

Added to these studies must be the cautionary note sounded by Christina Haas and John Hayes that "some machines can help people write more and better, but some machines may also make them write more poorly" (10). The same can also be said of word processing programs, as Hawisher indicates. Finally, as Stephen Bernhardt and his coauthors suggest, some people can take "ownership of the computer and use it to good purpose" while others cannot (126).

Controlling Fluency and Fluidity

I believe that future research will, in fact, indicate that computers are significantly affecting students' texts but that these effects have both positive and negative manifestations. On the positive side, the computer seems to provide students with a tool for increasing fluency and fluidity. However, because students lack the skills to organize this increased verbiage into a coherent, focused text, they are drafting their thoughts in disorganized and incoherent chunks which more closely resemble stream of consciousness than logical rhetorical sequences. It would appear that the positive effects of increased fluency are offset by the negative effects of disorganized and incoherent texts.

If students are to obtain the maximum benefits that the word processor appears to provide, then they will need to acquire the skills necessary for producing focused and organized texts. To help them acquire these skills, we will need to intervene during their composing processes to provide them with strategies for synthesizing this information meaningfully during the planning phase. We will also need to help them during the revision phase perceive when a lack of focus exists in their texts and then help them learn how to integrate and connect this information. If we can provide this kind of intervention, then the computer-influenced gains which students are making in fluency and fluidity may not be counterproductive, and we may yet see some significant improvements in their texts.

Generally, we as teachers have been unable to help students acquire the necessary skills to avoid this stream of consciousness by organizing information during prewriting or by re-organizing it during revision. And it is on the teachers' shoulders rather than the computers' chips that this responsibility falls. Research both by Bernhardt and his coauthors and by McAllister and Louth indicate that the teacher is the single most important variable in determining improvements in students' written texts. Marcia Curtis notes, "The single greatest question before researchers and teachers alike is . . . whether we are ready to re-examine our own instructional techniques, habits, and notions in the sometimes glaring light of this new machine" (343).

Our greatest and most immediate challenge is to find ways to help students gain some control over their increased verbiage. Harris suggests
that this is especially true for "multi-drafters" (189). We need to intervene early in the writing process to help students perceive relationships among their pieces of information in an effort to help them focus their drafts. Then throughout the process we need to help students not only recognize when their texts lack focus but also acquire strategies for developing a focus. Students need to learn to evaluate the relevance of their information and ideas in terms of their discourse goals and then to organize their data within a rhetorical context. They need to begin this synthesis of their ideas and information from an early point in the planning phase of the writing process.

Flower and Hayes, Carol Berkenkotter, and Carolyn Boiarsky all note that much of the decision-making process relating to the organization of information in a text occurs during predrafting. Stephen Witte cites the "pre-text" period, that period of time during which the writer attempts to "instantiate abstract plans and goals in linguistic forms," as a time when experienced writers organize much of their information (397). Thus, long before students are ready to draft ideas on the computer, they should be engaged in tentatively organizing their text. They can engage in various organizational activities either with pen and paper or on the computer. A number of software programs which allow the writer to move information around during the planning phase are now available.

Apparently, the more we can do during this pre-drafting phase to help students examine the relevance of their information and ideas and identify relationships among their information and ideas, the better students will be able to control their fluidity once they begin to draft on the computer. We can use effective conferencing techniques to lead students into recognizing the need to eliminate or at least to put aside for the moment information which does not appear to relate to their goals. For example, I have developed a series of inductive exercises designed to help students form tentative categories of information (Boiarsky). Long before drafting, students develop a focus for their text and an organizational pattern in which to communicate their information and ideas.

But early intervention is not sufficient. Students also need help in perceiving relationships among pieces of information after they have drafted; once a writer begins to draft, often new ideas form and the best laid plans will change. Writing is discovery. Thus, as students engage in the revision stages of the writing process, they need to be skilled in reading what they have written to determine whether or not their text is focused and coherent. However, most students lack these skills. Karen Schriver notes that because of the "knowledge effect," a writer's knowledge of both his or her goals and content, the writer is often unable to predict a reader's problems with a text. To help writers overcome this stumbling block, Schriver has designed a series of lessons using reader protocols which assist student writers in developing an increased awareness of readers' problems. Through such lessons, students can gain competence in predicting and then revising for reader's problems.
caused by unfocused and incoherent texts. In addition, because, as Haas determined, writers have difficulty reading text on a screen, we need to help students develop the habit of constantly printing out hard copy to read both during and between drafts.

A major problem in helping students at this point lies in our lack of knowledge of the cognitive processes involved in perceiving relationships. Precisely what skills are involved and what pedagogy is required to help students acquire these is a question for which at present we have no definitive answers; we are only beginning to recognize the complexity of this issue. Determining relationships among pieces of information requires students to synthesize. Yet, students have had almost no instruction in synthesizing. Most of their instruction, not only in English but in other subjects, has involved analysis. If we think of each piece of information as a piece of a puzzle, then writing is like assembling a huge jigsaw puzzle without having any straight-edged pieces to indicate the frame or ever seeing the finished picture on the box cover.

Haas' and Flower's findings in their recent research into reading behaviors addresses this problem. They found less competent readers work with one chunk of text at a time rather than integrating or connecting the parts. This is the "Sesame Street Syndrome." This generation of students who spent their infancy with Bert and Ernie and their adolescence with MTV and who have read only those parts of books included in the textbook anthologies used in their K-12 English classes have become used to watching and reading unrelated, quickly changing episodes and so do not require coherence or focus within a text. Along with the "knowledge effect," this syndrome may be a major cause of students' failure to revise effectively in their written discourse.

Perhaps one way to help students begin to overcome these problems would be to provide exercises in synthesizing in the same way we now provide activities in sentence combining. In fact, sentence combining, which is itself a synthesizing activity, might be used to teach the relating of ideas within a sentence as a first step in teaching synthesis. In addition, basing our methods on descriptions of textual cohesion by M.A.K Halliday and Ruqaiya Hasan and others, we might develop methods to help students perceive the need for cohesion within a text as well as use cohesive ties within their own texts.

Professional writers and an increasingly large proportion of the academic profession have become dependent on the word processor. The ISU survey indicates students are quickly acquiring this same dependency. But along with the new habit, students need to acquire the skills and strategies that professionals have mastered so that they can obtain the maximum benefit from this new technology.

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