RESEARCH IN WORD PROCESSING NEWSLETTER

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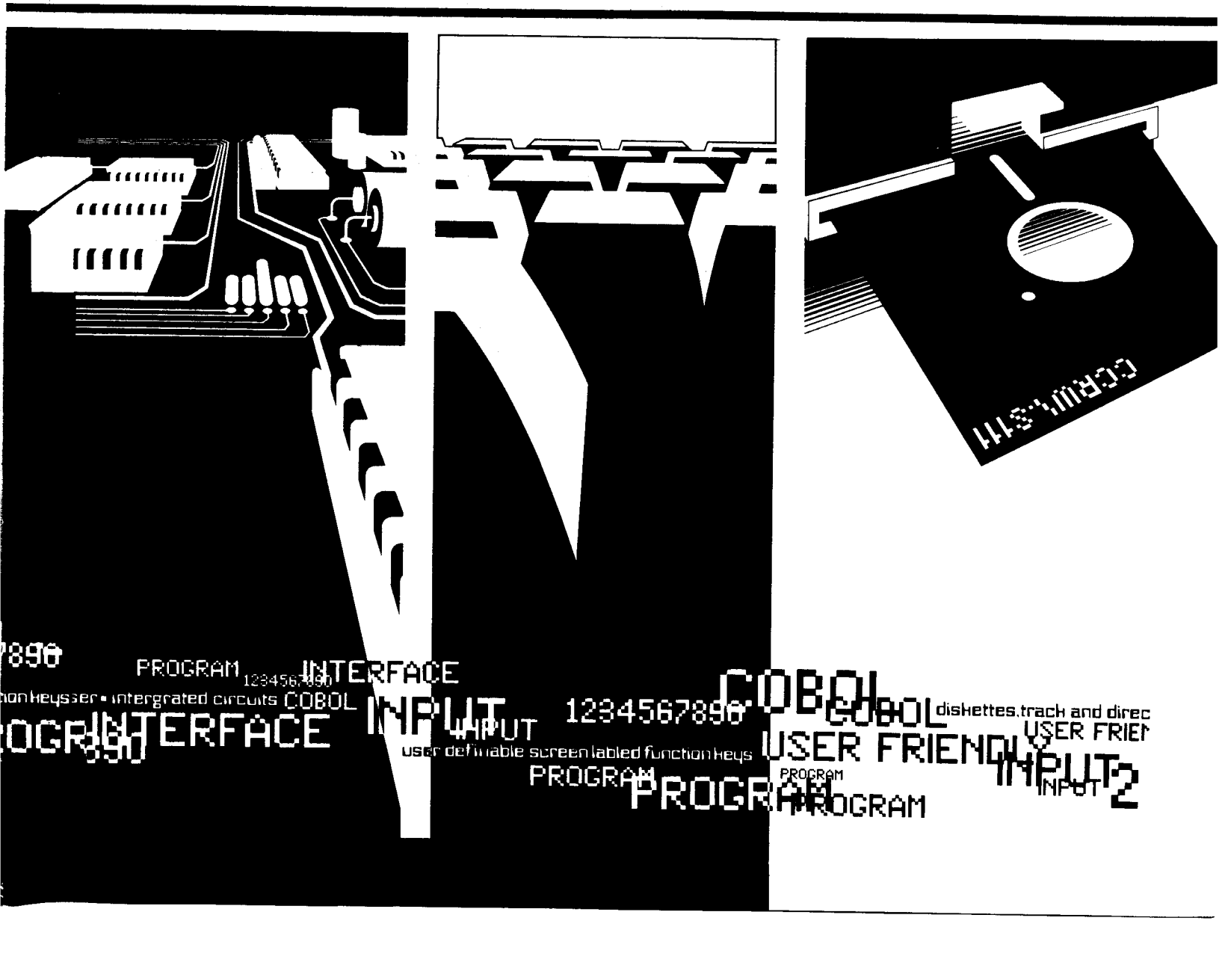
What makes a good computerized college writing lab?

page 4



RESEARCH IN
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NEWSLETTER

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Electronic Manuscripts in the Midwest or When Chicago Talks, People Listen

John S. Lawrence

Review of *The Chicago Guide to Preparing Electronic Manuscripts: For Authors and Publishers.* Chicago: The University of Chicago Press, 1987. 144 pages; $9.95 (paperback with comb binding); $25.00 (hardbound).

The "electronic manuscript" is a phrase often used to describe a glorious stage in the evolution of authorship. Its meaning has had a delightful (or exasperating) variability, depending upon the momentary states of microcomputer technology or practice in the trade. Unfortunately, some popular ideas about the electronic manuscript have led to enthusiasms and a few disasters from which publishers recovered by a temporary retreat to "the old way," in which authors do not talk to publishers about computers, modems, or disks.

As the editorial staff at the University of Chicago Press explains, they have gone through something like this evolution themselves. As the first small wave of computer-equipped authors began to send magnetic media, the press attempted to work with them all. Gradually, they discovered that some types of computer-based manuscripts were excessively troublesome. They also found that they needed to develop rules for themselves and for their authors. This new handbook, *Chicago Guide to Preparing Electronic Manuscripts,* is simultaneously an attempt to define the electronic manuscript and to set some guidelines for the electronic behavior of authors who deal with the vast University of Chicago publishing enterprise.

Do It, or Else!

We all know that, when *Chicago* speaks, the scholarly world listens. Based upon six years of experience in dealing with author-provided computerized text, their new book maintains the distinction of their original *Manual of Style.* They disclaim the intent of providing "an authoritative methodology" for all authors and publishers. And given the dynamism of computerized text management, their recommendations in this area will date quickly. Yet this is a book that every publishing scholar should want to read. It clarifies what it means to be an "electronic author" in a rather full current sense and will consequently alarm some scholars into a neo-Ludditism that insists on stopping at mere word processing. That's fine with Chicago, because they do not want to insist that their authors undertake unwelcome tasks.

Among the most helpful features of the book are the following:

Editorial and Production Sequence. The *Guide* offers a careful description of the physical and editorial sequence followed by an electronic manuscript. To this end, they offer helpful definitions of "electronic manuscript" (what the author creates with the word processor) and "electronic text" (the data that will be printed in a book, minus any formatting codes of the manuscript). This ultimately means that there must be two texts—one for presentation and editorial judgment and another that becomes the starting point in the publication process. This part of *Guide* would be useful to any scholars who are attempting to collaborate by means of shared disks. Their emphatic

clarity about the integrity of a copy-edited text, the need to have every change entered on the disk exactly as marked, etc, is generally salutary in avoiding electronically based confusions.

Generic Coding. This aspect may be simultaneously the most fascinating and the most repulsive. As the *Guide* explains, willing authors may help fight the cost spirals in scholarly publishing by introducing generic printing codes into the electronic manuscripts. The economics of academic print suggest to Chicago that authors who help the press forego keyboarding costs can permit lower sales price and ultimately larger press runs, better advertising budgets, avoid the need for foundation subsidies, etc. However, this means doing work traditionally performed by typesetters, who implemented the physical design of the printed text. Unfortunately, this sort of coding is drudgery, and utterly unlike anything that brought scholars to personal computing.

Simply Done?

To illustrate the task with one of *Guide*'s examples, if you were generic coding the footnotes for a chapter, it would go like this.

◄!Chapter One Notes!►
◄nttx►1. M. Gitelson, "On the Identity Crisis in American Psychoanalysis," ◄i►Journal of the American Psychoanalytic Association◄i► 12 (1964): 460.◄/p►

In such coding, there are dozens of symbols to learn as well as a grammar of application for them; one must be exceptionally attentive to details of design that one normally doesn't think of at all. In sum, the professional scholar now has the technology available to do tedious work formerly executed by the trades.

Is this progress? There are several positive ways to appraise it. First, learning to do such things is a step toward sustaining an economically fragile industry. And lest we feel too demeaned by association with laborious aspects of manuscript preparation, we should recall, as Elizabeth Eisenstein reminds us in *The Printing Press as An Agent of Change* (Cambridge UP, 1979) that during the birth of printing, many scholars were fascinated with the technology of moveable type printing. Quite a few of them typeset their own manuscripts, some becoming professional printers themselves. Finally, we might compare coding to begging for publishing support from foundations. Honest work does carry a certain dignity!

Viable Alternatives

Fortunately, the most mind-numbing aspects of this sort of text management may be only transitional. *Guide* refers to the Association of American Publisher's Electronic Manuscript Project, whose goal is "to develop, test, and publish a set of generic codes that will identify all possible text elements and special characters. . ." (pp. 2.2-2.3). Perhaps their completion of the project will make it feasible to integrate text preparation features into word processing software so that rapid conversion of document files (text in the initial form created by the word processor) can be quickly coded by means of automatic utilities.

Another hopeful approach, which is already being realized by Pergamon Press, a vast science/social science publishing empire in its own right, is to create the word processing software and to insist that authors submit their electronic texts as document files that have already been "pre-processed" for the press's purposes. They have released their *Manuscript Manager, APA Style* in both Apple II and IBM PC formats. In addition to leading directly into the front end of the publisher's print shop, this software is outstanding in the way it solves numerous problems peculiar to scholarly writing. At some future time, we may see both uniform standards and alliances among major publishers and producers of scholarware such as Pergamon and Dragonfly of *Nota Bene* fame. In the meantime, this book is the best profile, from a publisher's standpoint, of where electronics has taken scholarly publishing.

John S. Lawrence is a Professor of Philosophy at Morningside College, Sioux City, Iowa 51106. He has authored many texts, including *The Electronic Scholar* (Ablex, 1984), *Fair Use and Free Inquiry: Copyright Law and the New Media* (Ablex, 1980) and *The American Monomyth* (Doubleday, 1977).

Annenberg Project on Improving Student Writing

Sponsored by Annenberg/CPB, a national research project on improving student writing was begun this fall. The first phase of the project involved a leadership-level survey to help identify the kinds of writing programs and teaching strategies that work best and to speculate about what might work even better. The results of the survey are being compiled and expanded into a monograph. Among other concerns about student writing is a look at computers and other advanced technologies (video disks, etc.) to assist in the teaching or tutoring of writing. Contact Professor Tori Haring-Smith, Writing Fellows Program, Box 1962, Brown University, Providence, RI 02912, or call (401) 351-5294.

Word Processing in College Writing Labs: What the Experience at Ten American Universities Is Telling Us

Ruth Gardner and Jo McGinnis

Preparation is essential, even though good luck and good timing play a part in successful integration of computers into the composition program. At Colorado State University (CSU), according to Charles Smith, much of their success can be attributed to the fact that the software (*Writer's Workbench*) was ready to be tested, the university purchased sufficient hardware for the entire program after the first year of tests, and the people were interested in working with the equipment and materials that became available. As in most instances of "lucky" timing, however, the important factor is that the people have been doing the research and preparation necessary to move quickly when the opportunity strikes.

Flexibility and inventiveness on the part of the faculty and staff are essential. Oakland University researchers and software developers were forced to adapt to a university purchase of Macintosh computers even though their software was developed for Apple IIs. Dissatisfied with some portions of *Writer's Workbench*, originally developed for technical writing, CSU adapted them for students of writing. Even Drew University with its seemingly ideal situation of a computer-saturated campus has to deal continually with upgrading its hardware and software as new versions of both appear on the market.

The lack of money available for repair and maintenance of equipment has forced universities to come up with low-cost alternatives. For example, Oakland arranges for engineering and physics students trained in computer technology to come and handle problems with computers. A physics professor designed a cable system to secure the computers.

The lack of money for enough computers for faculty members has led departments to think of ways to provide access without their having to compete with students for computer lab time. Oakland and the University of California at Santa Barbara (UCSB) plan next to have a portable computer for individual faculty sign-up, as Drew already does. This computer may be used, for example, to work with students on an individual basis during office conferences or to model a revision technique for a class. In addition to plans for a portable computer, UCSB has a new English Department mini-lab with computers available for faculty use.

A strong commitment from the University to provide a computer-rich environment for the students is ideal. Small private universities like Drew and Drexel University in Philadelphia have done so. But even a large state university like UCSB shows how a commitment to computers at the university level gives individual instructors an opportunity to experiment.

University adminstrators can recognize and back with funds the research accomplished by faculty. They often don't. CSU's university adminstration was quick to recognize the worth of Charles Smith's and Kate Kiefer's research and to back those efforts. At Oakland, the University of California at Los Angeles (UCLA), and perhaps other universities in the study, however, the development of software for composing did not generate support from the university as a whole.

Strong support is necessary from both the Composition Program and the English Department. Such support creates a spirit of a team effort. CSU represents an ideal two-way environment of support and communication between research faculty and administration. Utah State University (USU) and Drew are other universities that represent cooperation in integrating computers into composition. Lacking strong departmental support, however, computer enthusiasts should at least hope for an environment in which they have the opportunity to experiment with new ideas. At UCSB, UCLA, the University of Alabama at Huntsville (UAH), and Wilbur Wright College in Chicago, instructors have been free to develop their courses integrating computers.

Lines of communication should be tended carefully. Successful integration of computers may be a matter of making sure the work researchers are doing gets communicated properly to the administration. One factor in CSU's success, according to the English Department Head, is that she is kept current with needs and concerns of the Computer Project. Helen Schwartz recommends publication in journals and participation in faculty computer committees as good ways to attract the attention of adminstrators.

Computer integration can have surprising results. At some universities, English Departments have found to their surprise that computer involvement has brought

them increased respect and esteem from other departments on campus. When CSU's Kate Kiefer and Charles Smith received attention from their work with *Writer's Workbench*, their department head perceived a rise in status on campus as a result, especially from the technical departments.

A university that offers computers integrated into their writing courses may be in a position to increase enrollment. At Drexel, student acceptances rose 30% in the first year computers were required for all entering freshmen, though the same number of university acceptances were sent out. A preliminary survey at CSU suggests that students would select their school on the basis of whether computers were offered to students of composition; they plan more research in this area. Certainly the questionnaires show that students have few reservations about using computers in composition, and that 75% of the students feel their writing has improved as a result of computers.

Planning the Lab

Locating the computer lab seems to cause problems for almost all universities. Oakland had to locate their lab next to the language lab, because the special heavy-duty wiring was already installed, although a more central location on campus would have been more convenient. Computers need constant temperatures to operate efficiently, and in spite of the cold winters in Fort Collins (CSU), air conditioners had to be installed at the CSU lab to take care of rising temperatures the rest of the year and when expansion expected in 1985 placed an excessive load on existing room ventilation. In spite of the generally balmy weather and open campus at UCSB, the dust entering the open windows may force them to install air conditioning as well.

Opening classroom buildings on the weekend so that students have access to the computer lab was a problem at Oakland. The location of the computer lab at UCLA in the Powell Library has the advantage of freeing the English Department from administrative worries, but with any expansion of the computer/composition sections the space would be tight. The computers are ranged about a large AV lab, and students who are writing share the facilities with others who are using other equipment. Because the lab is not conveniently located in relation to the Writing Program offices, not many instructors spend any time in the computer lab with students. Schools with choices prefer labs close to classrooms and English Department offices.

The ratio of printers to terminals is widely varied among the universities surveyed, but when the ratio is too high, problems result. The highest ratio of printers to terminals is at CSU with seven terminals per printer. The problem is exacerbated by the high ratio of *users* per printer (almost 400 to 1); University of Minnesota (UM) researchers find that a ratio of one printer to three micros or terminals is a workable ratio. Drew faculty and professional staff members have a printer for every computer; freshmen and sophomores have one printer per dorm room, or one for every two computers. Mainframe computer lab administrators (USU, for example) complain about the lag time between printing commands and printouts during peak hours, when the computer lab is competing with other university users for the same terminal time. The average wait at CSU (where a number of terminals are served by a central computer in the lab) for a printout is twenty minutes, but in rare instances and at peak load times, students must wait longer to get a printout of a text with *Writer's Workbench* analysis. [The recent acquisition of high-speed printers has helped to alleviate this problem at CSU in spite of still high ratios of printers to terminals and of users to printers.]

Although computer lab administration is most usually a staff rather than faculty position at these universities, there are advantages to both. Wallis Anderson of Oakland feels strongly it should be a faculty position, first so that the emphasis remains curricular rather than administrative, second because of the increased clout a faculty administrator has, and third because of the different perspective others have of that person. Having an administrative assistant to run the lab is all right, but released time for the faculty coordinator should be negotiated, she feels. Jan Ugan of USU is another faculty member who is also the Director of the Writing Center. Andrea Peterson, who as Assistant Director handles much of the Writing Center Administration, has a staff position but teaches one section of composition as adjunct faculty.

Nevertheless, computer lab directors as faculty are in the minority for several probable reasons. English departments have the freedom not only to bypass faculty hiring requirements when they place a staff person into the lab administration position, but also to hire computer specialists not ordinarily found among English faculty candidates.

Keeping the computer lab under English Department rather than under general university administration has advantages, although the schools are evenly divided in this regard. CSU's Blake Stewart, a computer specialist, now employed full-time by the English Department, no longer has to divide his time and his loyalties between the English Department and the University computer center. He and Geoffrey Sirc of UM are both involved with the continuing research in composition, a situation not likely when the computer lab director is not English Department staff. If, as at

UCLA, the computer lab is not part of the composition program but located in some distant building under the administration of the central library, the instructors do not become as involved with the process of computer-generated writing as they do when the lab is across the hall and directed by someone familiar and well-known. USU administrators emphasize that the presence of instructors in the lab helps to model writing behavior for students. Helen Schwartz counsels shared-use agreements if the lab is not under the direct administration of the English Department. She suggests avoiding computer science engineers and administrative users of computers in such agreements, who tend to take over the lab.

Nevertheless, having the university administer the computer lab takes the pressure off English Department administrators for coming up with new sources of funding and for the day to day maintenance of lab equipment and supervision. At UCSB, the university commitment to computers has provided the means for experimenting with computers in composition classes that would not have been available if it had been left up to departmental administration.

Computer-equipped classrooms are desirable but rare. A few universities have access to a computer-equipped classroom, but considering the problems of access for large numbers of students, instructors will have to find ways of teaching writing with only very limited access to a computer classroom. At UAH, they are not yet faced with the problems of providing access to regular composition classes. Only Business Writing and Technical Writing and Editing courses are held in a computer classroom in which every student is seated at a terminal.

Few of UCSB's instructors are as yet using the Macintosh computer classroom in the university computer lab, so access has not yet become a major problem. Until that time, the option for reserving a computer classroom is made possible by folding curtain-walls. The most used room for English instruction is one in which each student has a computer, and four high resolution monitors stationed around the room show students what the instructor is modeling at her own computer. Jeffrey Marcus, Microcomputer Lab Manager at UCSB, would like to see more classrooms with computer monitors. He sees such monitors as an extension of the overhead projector. He would also like to install more individual carrels with computers so that instructors could hold office hours for individual conferences with students.

At Oakland, a small university, students can go into the small computer room with eleven terminals and double up at a terminal for classroom instruction on line. At UM, the lab director admits that "it's a mess" at the beginning of the semester when large numbers of students arrive in the computer lab for preliminary word-processing orientation. Drexel has two computer classrooms, one with 30 Macintoshes with two monitors connected to the instructor's terminal. Another classroom has 30 128K Macs, but no instructor monitors are available. No printers are available in either of these classrooms, however.

Alternative configurations of hardware should be considered in a computer lab. Some composition courses, like UAH's Business and Technical Writing, work best in computer classrooms in which each student sits at a terminal. Certainly, a computer classroom that has available not only individual terminals but also demonstration monitors controlled from the instructor's computer is attractive. Yet, for orientation purposes, doubling and even tripling up at a terminal has advantages as well: learning with a partner provides a way to reduce apprehension (sharing responsibility with another) and to increase collaboration in learning word-processing techniques. Perhaps a small room like the one described at Oakland, into which an instructor can take a class for orientation sessions, should be available.

Still another option is a room with only one instructor-controlled computer that allows students to view word-processing techniques via high resolution screens. The lab at Drexel maintains a microcomputer on a cart that can be delivered to classrooms for demonstration purposes.

Networking has many possible uses and benefits in labs. Only USU, however, has a system in which students can call up each other's work for peer review, instructors can call up student files and give feedback on drafts, and all users can leave "mail" for each other via the electronic bulletin board. Students may use the computer from other locations on campus than simply the Writing Lab—another advantage of networking. CSU hopes soon for a network system that will permit students to access the file-server computer from any terminal in the lab and that will permit an electronic bulletin board. Drew has two electronic bulletin boards for students, faculty, and staff now, and Drew adminstrators hope for complete networking of all PCs on campus, including access to library holdings. Helen Schwartz has worked out a system of leaving messages on diskfiles so that students can comment on other students' ideas, but the lab has no real networking capability. At UCSB, Apple TalkNET in the MacIntosh labs soon will mean no disks will be needed and printing will be spooled, but instructors cannot call up a student's work on another computer. Lab administrators there are waiting for increased demand for networking before going to the expense of installing it.

Computer labs need to accommodate the many ways students learn. Students learn to use the word processor in different ways. Some work best with one-to-one instruction; therefore, helpful, friendly, non-intimidating lab assistants are essential. Some students work well with printed manuals; however, most computer documentation is incomprehensible to the average user. Most universities end up writing constanly revised user manuals for their students. Some students need only a short orientation, with followup demonstrations after they have had some experience. (Most can comprehend only a short orientation lecture before they have hands-on experience.) Several labs post frequently used commands on the walls so that students have only to look up to see what to do. Most universities consciously provide a number of ways for students to learn, but most also feel the need for more work in this area.

Labs must provide students with help for composing problems as well as problems with hardware and software. The latter are easily handled by computer technicians and lab monitors trained in the software. The ideal situation is much like that of USU, where the Writing Center with its writing skills tutors are in an adjoining room, and the directors themselves are composition faculty. CSU attempts to provide writing skills help on a limited basis in the computer lab, but most students see their teachers or tutors in a separate Writing Center located in another building. Other universities, like UAH, UM, and Oakland permit their lab monitors, often students with expertise both in computers and writing, to help with problems in composition. Others, like CSU, discourage their helping with writing, asking lab monitors to restrict their advice to technical problems with the computers. Some instructors hold office hours and conferences in labs.

Computer labs ideally should be able to accommodate the needs of students in other writing classes after the original computer composition classes. Although many students go on to buy personal computers once they have taken a computer writing course, the university's commitment should keep in mind the needs of these students once they have acquired a facility with and a dependence upon the technology. CSU instructors and administrators cite this problem not only for faculty who teach with computers but also for the students who exit the freshman computer writing course.

Involving the Faculty

Departments should treasure or import a computer enthusiast. The primary factor involved in integrating computers into composition is at least one enthusiastic and motivated researcher in the composition program. Not necessarily tenured professors, some of the most involved researchers are from the "adjunct faculty." Their enthusiasm is contagious, helping to involve a more reluctant faculty to participate in computer technology.

Computer-proficient "gurus" often have to be imported from outside, however. English faculty teamed with the Psychology Department at UCLA to develop *WANDAH*. Blake Stewart at CSU was on loan from the computer center on campus before he was lured away to work full time for the English Department.

Faculty training becomes an issue for those not yet involved. Most universities allow the faculty to become familiar with computers at their own pace. Most faculty members originally learn by purchasing their own computers or—as at Oakland and UCLA—learning on the university mainframes. As one or two become computer proficient, they in turn become the unofficial instructors of others who become interested. Helen Schwartz suggests that a Computer Committee in the Arts and Sciences can do much to raise consciousness and to encourage use of computers, however. English departments can support attendance at 4C's Conferences and subscribe to computer journals. Computer labs in English departments can provide access to faculty members who have not yet decided on a personal computer. Other English Departments and computer labs maintain a portable computer that can be wheeled into faculty offices on a cart for individual use. Oakland offers beginning training sessions for English faculty, both regular and part-time instructors. Instructors there who use computers in their composition courses get together once a year to discuss teaching techniques. CSU has one or two hour computer sessions in their orientation for Graduate Teaching Assistants who will be teaching freshman composition courses with *Writer's Workbench*. Departments who wish to begin integrating computers will likely have no trouble with finding willing instructors. (All instructors at these universities were self-chosen. Graduate Teaching Assistants at CSU and USU and basic writing instructors at UCSB are required to integrate computers into their courses).

Nevertheless, some faculty members balk at learning electronic gadgetry that has no proven educational benefit, says Valarie Arms of Drexel. Faculty training needs to emphasize that a good techer can use computers in a lab or class without being a computer expert. Arms quotes Alfred Bork's analogy that teachers use textbooks without knowing how to print them. This becomes less of a problem as more and more faculty members purchase and use their own computers.

Teaching the Students

Computers will not take the place of instructors in composition. Rather, they have the capacity to free

instructors from some of the more frustrating tasks. Style-checkers and spell-checkers will help students to correct mistakes that can be caught by the computer. Instructors can then concentrate more on more substantive feedback. And, because students find revision to be far easier with a word processor, the idea of rewriting a paper to improve it is not as much a burden to the students.

Charles Smith of CSU says that style checkers like *Writer's Workbench* "not only help students but also relieve faculty of much mindless labor." He adds, "No longer are papers I mark riddled with spelling errors; no longer do I find common diction errors; no longer do I circle excessive reliance on *to be* verbs; no longer do I mark passive voice in analytical and argumentative essays; no longer do I write comments about sentence combining and excessive numbers of simple sentences. . .As a result, I have never returned essays with so few editorial remarks or focused my closing comments more exclusively on those matters that most concern me (and my students)."

Valarie Arms says: "I still spend the same amount of time teaching with the computer as I did before. However, the overall use of that time is more productive; I can make substantive comments rather than having to correct mechanics and I can encourage more peer review because the students know how easy the changes are. Students actually find the course more personal and are pleased at the individualized instruction which the lab permits."

Instructors must be aware and must remind their students that the computer is not the authority. They are responsible for their writing; the computer is only another audience. At CSU, all instructors find it necessary to warn their students against trusting the computer too much. The spellchecker doesn't catch the differences, for example, between *to, too,* and *two,* or typographical errors that form other words. Students sometimes get caught up in playing a competitive game with the computer, trying to raise the "reading level" assessment, for example, by adding some polysyllabic words. UM's Bridwell and Ross state emphatically that "the student should see the computer as a tool, not a super-efficient authority."

Lack of experience with typing, computers, and word processing among students doesn't have to be a problem for instructors. Students learn quickly when a variety of learning aids are made available. Wallis Anderson of Oakland thinks that a lack of experience promotes sharing among students. Even the instructor need not know that much; the students will quickly teach the teacher.

Lack of typing skills is not the problem it was expected to be. Anderson thinks that the process of working on a word processor is so wonderful for students who don't know how to type compared to writing by hand that they learn to input rapidly. Some instructors, like Helen Schwartz, prefer that students come into class with a threshold knowledge of keyboard and text entry. UCLA instructors don't worry about a lack of experience with typing; students are expected to be able to type. USU instructors require all essays to be typed, whether students use the word processors or not. As students work with computers at ever younger ages, this problem will disappear altogether.

Instructors integrating computers into a composition course should be careful to keep it a writing course and not a computer course. Students should begin WRITING on a computer immediately. It is tempting to spend time in ways that are not productive in improving writing. One way is by giving too much instruction in the ways that computers operate. Students don't necessarily need to know why the computer works in a composition course. Instructors need to give students the least complicated commands until the students need them. UM's program directors, for example, were "determined to give the writers much freedom simply to think and write and keep our computing systems out of their way."

Another way time is taken away from writing time is to emphasize the appearance of an essay over the content. Computer software is available now that will give the appearance of typeset copy, complete with graphics. While these capabilities are exciting, and a sense of pride in the finished product is important in the attitude of the student toward the writing process, the instructor should remember that students are in the course to *write* and to learn ways to improve that writing rather than ways to dress up the copy.

And another way time gets stolen away from writing instruction is assigning CAI "workbook" exercises to correct editing problems. None of the schools surveyed used these kinds of CAI except on a minimal basis. At UM, for example, word processing itself is at the core of the "learn to write by writing" philosophy.

Computer-integrated composition courses should attempt to provide for the various ways students learn to write. While, as UM and others have found, word processing is the fastest and easiest way to integrate computers into the writing process, the software that helps students to prewrite, organize, and revise should be made available to them—made available but not necessarily required. After students have had a chance to try it out or to internalize the process it embodies, it may be made optional. Helen Schwartz calls these programs "training wheels," disposable after learning a skill. The word processor is the bicycle, always a

necessary tool. Students who are more visual and spatial in their learning style may respond to the option of using computer graphics to illustrate their text or even to help them generate ideas, as with engineering students at Drexel.

The spelling checker is useful CAI. Students who are poor spellers are enormously relieved. Although some instructors still feel the use of spell-checks is somehow unethical, according to some of the administrators surveyed, many are just as relieved as the students. The spell-checkers that highlight the words that do not appear in the spell-checker dictionary but do not offer optional variants at least require the students to go and look up the word in the lab dictionary (or ask their neighbor). If the same word gets highlighted often enough, the possibility that the student might eventually remember the correct spelling of the word is increased. Helen Schwartz doesn't see any difference between the computer flagging possibly misspelled words and the instructor circling misspelled words in red ink. In fact, flagging words before the final draft encourages students to look up their words in the dictionary and actually change them, which they are not likely to do in a graded text.

The ideal situation would seem to be a library of varied CAI (and word processor of different levels of complexity) as at UCSB. With many choices available, instructors could use computer software to individualize the course more than is possible without them, to make writing courses *more* human, rather than less, which some humanities faculty feared. Instructors and students could also decide when they need to hone a skill and request appropriate software, from typing tutors to sophisticated open-ended programs to help with invention, substantive or organizational thinking and to increase creativity and growth. For example, *WANDAH* (now *HBJWRITER*) guides students through their choice of several open-ended invention, organizational, and revision heuristics, provides a simple menu-driven word processor, and includes basic editing capabilities.

No commercial software is likely to serve all the special needs of university English departments. Many universities, understandably, are writing software designed for their own course requirements. UM, especially, has a commitment to designing a program that is adaptable to the individual needs of their individual instructors.

Use of computers in teaching writing encourages variety in teaching methods and techniques. Instructors and administrators who would like to see the lecture method of instruction decrease in their composition classrooms will be gratified to learn that several universities in the survey mentioned that since computers have been integrated into the composition courses, instructors do less lecturing and the students are more actively involved in the writing process. Computers offer opportunities for more flexibility of teaching techniques and more variety in learning activities: peer review, group discussion, and collaboration in thinking and writing as well. Networking and electronic mail increase the interactive learning process, according to instructors at USU.

In another example, Valarie Arms at Drexel says that prior to using computers in her technical writing classes she used peer review techniques and individual conferencing on written drafts. Now rough drafts are reviewed on the terminal. "The lab time has replaced the conference and class review time with gratifying results. The lab has a workshop atmosphere that makes criticism easier to give and to receive because everyone knows how easy it is to make suggested changes. . ." Arms was also surprised to find striking results in experiments with student collaborative writing. Because the computer can hold and store different contributions by students in multiple drafts, students can experiment with achieving a consistent style.

Instructors of computer-composition courses should be prepared to adapt to the needs of their students as a result of using computers. Answers from student questionnaires suggest several areas of concern that perhaps are not being adequately served as yet:

A. Although 77% of student responses indicated that they received enough training to be comfortable, as many as 33% are not able or are only marginally able to move paragraphs with ease, a skill essential for making global revisions. Training is casual in many places, but these answers indicate that more followup of initial training would be beneficial to make sure students have learned what instructors assume they have learned. Lab assistants should be trained to watch for students who are not using the computer to its fullest capabilities and to encourage questions from students using the lab.

B. Students indicate their greatest fear is in losing their work as a result of using computers. It will happen. The only way to keep the loss to a minimum is to emphasize the importance of making backup copies or hard copies of work frequently. One university has a poster that commands, "Print it or lose it."

C. Some students are frustrated that they are not learning enough about how computers work. Teachers who keep in mind that the course is a WRITING course and not a COMPUTER course will make it clear from the first that students will be expected to learn the intricacies of computers outside the writing course they are enrolled in.

D. Some conscientious students will become so involved with the computer's capabilities for revi-

sions that they will overwrite their essays, making endless changes at a local level that do nothing to improve the original idea, one that might not be worth the hours the student has put into it. These students will be understandably dismayed that their work has had so little result. Universities with limited access to computers do not face this problem. When time is severely limited, students must enter their texts and leave the lab quickly. When students can sit for long periods of time at a computer, they may need to be encouraged to get instructor or student feedback at early stages of the writing to be sure that their ideas are worthy of serious development.

POST SCRIPT

The most general conclusion that one can draw after doing the research involved in this study is that ***computers with word processing and appropriate other software, used individually and flexibly, with emphasis on writing, are a tremendous boon to composition administrators, faculty, and students.*** The responses to our questions suggest that computers are the tools we have been waiting for. We have been there at the meeting of the pedagogical paradigm of writing as a recursive process with the technology necessary to fully implement it. Now we can ask our students to rethink and revise until we and they are satisfied that both learning and communicating have taken place in their essays, not just until we are all exhausted.

If it were only writing teachers who were enthusiastic about word processing, this would surely be enough explanation. But students, who are usually beginning writers unconcerned with pedagogy, are enthusiastic. And teachers as writers, other professional and technical writers, researchers, collaborators, novelists and poets are equally enthusiastic. That this is so suggests that our current pedagogical paradigm reflects the felt reality of writers writing—that at the least their writing and their ways of writing are enhanced by the capabilities of the computer. How writing is enhanced by computers in composition courses at ten universities we have hinted at in this study.

But in spite of this and other studies, almost everything remains to be learned, to the joy of professional learners. And the possibilities of other kinds of instructional CAI and AI and simulation enliven educators in every field with the sense of being on the edge of radical changes in our perceptions and practices—as adminostrators, teachers, students, writers, and human beings.

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