Computers in teaching writing: An annotated bibliography

Thomas A. Chambers

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COMPUTERS IN TEACHING WRITING:

AN ANNOTATED BIBLIOGRAPHY

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A Thesis

Presented to the

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In Partial Fulfillment

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in

English Composition

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Approved by:

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ABSTRACT

Computer-assisted instruction in writing dates back nearly two decades, but widespread interest in use of the technology grew rapidly after the introduction of micro-computers to the classroom in the late 1970s. By 1984, it seemed appropriate to measure the extent and success of computer-assisted writing instruction, and this thesis attempts to serve that purpose via an annotated bibliography and summary essay.

The bibliography consists of seventy-five entries, published between January 1966 and January 1984. Included are articles from English journals, technological trade publications, education and consumer periodicals, and the proceedings of a special conference dealing with computers and writing instruction. Each article is briefly described and its place in the literature as a whole is evaluated. The articles are divided into four major categories of current computer usage: Drill and Practice, Tutorial/Dialogue, Word Processing, and Textual Analysis.

The summary analysis, which opens the thesis, discusses each major usage of computers in writing instruction and concludes that there is no good evidence to date indicating that teachers must, or even should, use computers as a major component of writing instruction. Greatest prospects seem

to exist for the word processing function, but only with
substantial improvement in software designed specifically
for the classroom.

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INTRODUCTION

It is axiomatic that technology moves faster than scholarship -- much faster. Nowhere is this more evident than in the development of microcomputers and our understanding of how (and even whether) they can be used successfully in the teaching of composition. Since the first microcomputers (popularly called personal or home computers) became widely available in 1978, advances in microprocessor design have created machines that do more, and do it faster, than previous machines that were barely out of the cartons. Yet, in the same period, application of this remarkable technology has barely touched American education. And, despite a great deal of early prophecy, computers are less used in composition instruction than in almost any other discipline. The purpose of this essay, and the annotated bibliography that follows it, is to trace how, and with what success, microcomputers are used to teach writing and to suggest some of the prospects and problems for future development.

There are four basic applications of microcomputer technology software now being used to teach writing: drill and practice, tutorials/dialogues, word processing, and textual analysis. They are described in order of ascending

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complexity and, roughly speaking, chronological development.

Drill and practice programs were the first major applications of computer technology to writing instruction, and it is easy to see why. These programs are relatively easy to write, inexpensive to buy, and convenient to use. They are organized on the same principle as the traditional drill methods used in flashcards or workbooks: repetition and practice builds competency. Drill and practice programs are prevalent in the areas of grammar, syntax, and general mechanics, and are frequently used in a remedial capacity. They are the mainstays of "learning laboratories" where media instruction is used to remediate fundamental writing deficiencies. A recent directory of software lists over 250 programs which provide practice in these areas and constitute 80% of all "language arts" writing software (See Chartrand, p. 15). Proponents of these programs point to the "activeness" involved in learning to use the program and the immediacy of the computer's feedback to student response. They also laud the computer's patience, accessibility, and confidentiality in dealing with remedial and slow learners.

Regrettably, most drill and practice programs become very tedious and, at least after the novelty disappears, few students seem willing to spend much time on them. The early programs were entirely linear, which means students were locked in to a progression of exercises that might not fit their needs or interests. Many of these programs are still

in use today. The largest single development of this software occurred in the mid-1970's at the University of Illinois and resulted in PLATO, a simple to use set of drill and practice programs in five disciplines: accounting, biology, chemistry, English, and mathematics. The programs were tested at five community colleges, however, and the results indicated that they did little to improve student writing achievement (Wresch, p. 32). As a simple beginning to computer assisted instruction (CAI), drill and practice programs were certainly necessary, but they were soon criticized for constituting a trivial, ineffective, and wasteful use of computer technology. The proliferation of these programs and the inevitable commercial hype that flowed from the firms marketing them did little to endear CAI to teachers of writing.

Tutorial programs, and their more advanced cousins, dialogues, were a natural outgrowth of dissatisfaction with the limitations of drill and practice. Tutorials have the advantage of branching programs, which permit the computer to call forth information and exercises relevant to student input to the program. Instead of merely identifying an adverb in a sentence, for example, and flashing right or wrong to a student response, tutorials can note a wrong answer and display explanations and supplemental exercises for additional practice. These programs achieve greater flexibility by anticipating incorrect responses and providing immediate remediation only for those who need it. The goal is to

reach some equivalency to a human tutor, who can fashion exercises and instruction to the particular needs of a particular student; as such they represent a major improvement over the linear and lockstep drill and practice software.

But tutorials also have their problems and limitations. In many ways they are just better drill and practice and are not applicable to higher order thinking functions involving analysis, synthesizing, or artistic creativity. The fact that they can be used only for low order learning, of course, does not negate their value but it does mean that they should at least be superior to conventional methods at what they do. As yet no good evidence exists that they are. Also, tutorials are difficult to write and therefore much more expensive than drill and practice software; the branching function requires very elaborate programming and much more content knowledge, since anticipation of the broadest possible range of student responses to each question is involved. Although they constitute a refinement of the technology's application, tutorials are still useful only with certain students and under certain circumstances, primarily mechanics-deficient students who like and are comfortable with the technology.

In an effort toward further refinement and greater applicability to the writing process, dialogue programs were developed. These are the "talking" programs, tutorials that ask questions of students and that at least simulate some sort of response to answers. One of the earliest and most

often cited of these programs was developed by Major Hugh Burns, a writing instructor at the Air Force Academy. Burns, with the assistance of George Culp, wrote three writing invention programs based on three popular heuristic techniques. These use the questioning mode to prod students into topic delineation and the marshalling of evidence to support primary points. Each program gives the impression of conducting a dialogue between the computer and the student although, of course, the communication is not content specific and is entirely artificial. Burn's programs provide a methodical presentation of heuristic devices and in so doing help focus on what the student already knows, and what the student needs to know, before proceeding with the paper. Each program's manner is unfailingly friendly and encouraging (an often-claimed advantage over human teachers) but is entirely arbitrary in the sense that it responds identically to anything a student answers. For example, the program may prompt for facts supporting a thesis statement, but will respond warmly whether the student types a brilliant answer or gibberish. It takes more than a little hyperbole to call an exchange a dialogue when one side has already decided exactly what it is going to say before the other side even sits down to talk.

Dialogue programs do, however, represent an effort to encourage higher order learning functions during both the pre-writing and composing stages of the writing process and, as such, represent growth over earlier applications. They

do not, however, seem to do a better job of presenting heuristics than a good teacher, who can answer questions, clear up confusion, answer content-specific concerns, respond to student anxiety, and terminate the whole business and try something else, if that is advisable. Cheery responses aside, it would not take most students long to realize that the computer is a very rigid unbending instructor, even in dialogue programs that are intended to bring about creative and spontaneous thinking by their users. One advantage of these programs, however, is that the entire "dialogue" can be printed out as hard copy for students to take with them, and they can be easily and quickly revised during and after program use. Students who are able to consult and review the best of their interactions with the program may have a useful aid to their writing.

It is this application of computers to the creative processes of writing which constitutes the ultimate test of the technology's ability to simulate human intelligence. We need no further evidence that a computer's binary system can tabulate and calculate far better (and much faster) than can the human mind. The computer's superiority for repetitive drill and practice functions is also widely accepted, although the long-range efficacy of such applications for learning may still be in doubt. But the great challenge for computers lies with those subjective and complex processes that involve rhetorical invention and written composition, processes which the discipline itself does not fully under-

stand. Writing may be an act of creative intelligence that no computer can simulate, let alone duplicate. Computers will produce words via a programmed formula, but they can neither create nor evaluate those words in terms that constitute an understanding of human communication. It is this combination of amazing vitality and total stupidity that makes the computer such an enigma for teachers of writing and the authors of dialogue software.

Word processing is the most frequently used computer application in writing and it is the area with the most sophisticated hardware and software. The reason for that is not hard to deduce: It has direct application to productivity in business and industry settings. The sale of word processors and their software is now a billion dollar industry and is growing at a phenomenal rate. That sort of economic push tends to get results in technological development and, in these times of government deficits and lowered expectations, instructional applications have lagged. Ironically, the sophistication and complexity of word processing technology has retarded its use in school settings; commercial word processors have been too difficult for students to learn to use. The introduction in the Summer of 1983 of Bank Street Writer (and WANDAH) and other simplified word processing packages promises to create a genuine revolution in the teaching of writing, provided sufficient hardware is made available and students are taught to type. (Typing instruction packages already constitute the most

popular software, aside from games, being purchased by computer owners).

One tested application of word processing for writing instruction involves frequency and ease of revision for novice writers. It is reported that beginning writers are often loathe to revise their work because it necessitates the laborious process of recopying. With a word processor, students are said to be more willing to edit their papers, since the processor makes such corrections easily and can quickly print any number of draft copies. It is also reported that writers work more freely and spontaneously on the computer because the words that appear seem much more transitory than those on the written page. On the other hand, one researcher suggested that the mechanics of using a word processor may crowd short-term memory and lead to the development of poor composing practices, although simpler software packages may eliminate this problem. To date no conclusive evidence exists proving that word processing results in improved writing in any quantifiable sense, but improved programs, intelligent curricula, and expanded research may well find that result in the forseeable future.

The use of computerized text analysis is at once the oldest and the newest application of computers to the instruction of writing. Efforts to use computers to grade student essays date back to the early 1960s and have reappeared off and on since then. The hope was that a program could be written which, through a few key elements (graph-

emes, punctuation, verb tenses, word choice, etc.), could identify the quality of a piece of student writing with a consistency equivalent to that of a panel of human readers. English teachers at once hoped for an end to the drudgery of grading stacks of student papers, and at the same time feared that their discipline might change radically or even disappear. It was at about this time that some English instructors began to downplay the importance of mechanics in writing and stressed the importance of content. The process of writing, it was said, is a learning experience of its own. In any event, the right combination of graphemes became one of the lesser concerns of a new generation of writing instructors who found the subjective nature of holistic grading to be better attuned to a modern view of what writing instruction should do. Like everything else in this area, no one can yet say whether the writing is better or worse for the changes.

The new view of computerized text analysis is in consideration of style, rather than mechanics. Computers can be programmed to identify sentence length, use of modifiers, active and inactive verb tenses, verbosity, cliches, T-units, and many other components that make up clauses, sentences, and paragraphs. The claim is that if we can get students to improve these small elements of composition, the overall result will be improved writing. One program even goes a step further and makes judgments on the affective style of writing by using a 1000-word semantic dictionary to

determine the emotional power of word choices. The authors hypothesize that computers may be able to scan and evaluate speeches and advertising copy to determine probable audience response (Anderson, p. 42). Most instructors may not be ready to go that far, but computer analysis of writing has the potential to grow more sophisticated in ways that will result in some valuable feedback to both novice and mature writers. If the computer is able to spot patterns affecting tone that a human reader would miss, text analysis could develop into a helpful tool for the composition instructor.

The four applications just discussed constitute the major uses of computers to date in the teaching of writing. Compared to the advances in computer technology over the past fifteen years it is not an impressive recounting, yet each application has potential value. Drill and practice programs may supply a modern learning skills laboratory with software that provides patient and accessible practice in grammar and mechanics for students from elementary schools through college. Branching and dialogue programs represent attempts to stretch computer technology to its creative limits. Word processing may improve student writing through simplification of revising and editing. Finally, textual analysis could allow us to identify and count components of writing that might otherwise go unnoticed, and improve revision as a major component of writing instruction. That no one of these applications has yet been developed to its full potential, nor been proven to facilitate writing excel-

lence, only illustrates the potential for research and development in the field.

Some barriers must be overcome before the full potential of microcomputers in the teaching of writing can be approached. Writing instructors at all levels have not been convinced that CAI can help them with their problems in teaching writing, a caution that has probably served them well in this instance. A discipline proud of its roots deep in the humanities is not likely to embrace computer technology too quickly. Of more practical concern, computer hardware has not been readily available in most schools. One microcomputer per classroom, let alone one per school, is not likely to have any real impact on instructional modes. ("Imagine one pencil per classroom," as one reviewer puts it.) Additionally, teachers and students will need to get comfortable with the technology, and students will need to acquire typing skills early, although improvements in "user-friendly" hardware and software will do much to facilitate easy accessibility.

Perhaps the greatest responsibility for the future of computer technology in the teaching of writing lies with the classroom teachers who will be under increasing pressure to use it. It is their responsibility to demand quality software that meets definite instructional needs, and to resist pressures to use computers simply because they are available and fashionable. It would be a perversion of both quality education and computer technology if the ability of

computers to identify specific features of grammar and syn-
tax is allowed to become the focus of writing instruction,
replacing the more subjective measures of writing as a
process of learning. Just as the adoption of standardized
tests may cause teachers to "teach to the test," so may the
availability of computers cause teachers to mold their writ-
ing instruction to what the computer can teach, rather than
what students need to learn, about writing. As the tech-
nology develops, it will fall to teachers to see that com-
puters serve valid educational goals, rather than change
teaching to suit computers.

Finally, the confidentiality of the writing process,
including instructor evaluation of student writing, needs to
be protected. The technology exists to tap into anything
being written on a computer screen or stored in a computer
memory; but this ease of retrieval, a benefit in other
circumstances, can turn against the instructional process if
used without the consent of the writer. Just as teachers
need to know that outsiders will not eavesdrop on their com-
puterized comments and evaluations to students, students
need to know they can develop drafts or work on a tutorial
without teachers eavesdropping on their work. As in other
areas of modern life, misused computer technology can invade
cherished regions of privacy.

Whatever the future may hold, to date there is no
evidence that writing teachers need to use, or even should
use, computers to teach writing. Computers are best suited

to drill and practice in mechanics and grammar, and even that benefit may wane as the novelty effect wears off. Students weaned on video games will not necessarily sit still very long for spelling drill, no matter how well it simulates PAC-MAN. The quick decline in popularity of such games (from their zenith in 1982) may be evidence that computer graphics grow stale rather quickly. And if this is so, how much less useful are the tutorials and dialogues that constitute little more than electronic workbooks? As one reads through the bibliography, it becomes apparent that the work of some courseware authors is shaped more by what the computer can do than by what needs to be done.

The annotated bibliography that follows does not pretend to be all-inclusive, nor does it need to be. It does, however, represent every major thrust (and most of the minor ones), of research and opinion in the area of computers in the teaching of writing published between January 1966 and January 1984. Those eighteen years saw no definitive and seminal work, but they did show a great deal of pioneering in the exciting convergence of a new technology with an old and respected discipline.

I. INTRODUCTIONS AND SURVEYS

Barth, Rodney J. "ERIC/RCS Report: An Annotated Bibliography of Readings for the Computer Novice and the English Teacher." The English Journal. No. 1 (January 1979): 88-92.
    Intended for high school English teachers and dealing with CAI to early 1977, Barth's essay is useful only for some of its citations, which were not found elsewhere. It briefly surveys computer grading, language arts applications, writing, and software. Unless the reader is seeking some obscure citations from the mid-1970s, it can be easily skipped.

Bourque, Joseph H. "Understanding and Evaluating: The Humanist as Computer Specialist." College English. 45, No. 1 (January 1983): 67-73.
    Does the development of instructional software in writing deserve the same credit as traditional publications in English for a professor at career review time? Does an English professor teaching colleagues how to use a word processor deserve professional service credit equivalent to hours spent on curriculum committees? These and other very practical matters of concern to the discipline are discussed by Bourque in this deadly earnest call for academic respect for such endeavors. The author provides a checklist of "sensible criteria" for judging software and concludes that English departments that wish to join the contemporary move to CAI would do well to reward department members who are working successfully with computers.

Bradley, Virginia N. "Improving Students' Writing with Microcomputers." Lanugage Arts. 59, No. 7 (October 1982): 732-743.
    Bradley wrote this article for elementary school users as part of the Language Experience Approach to the improvement of reading and writing skills. Her review of computer applications includes invention stimulation, electronic mail (children writing computer letters to each other), text analysis, and word processing. Included are suggestions for materials and usage procedures and a sample sentence combining program for use by sixth graders. The

author concludes by observing that the children who use these programs seem highly motivated by seeing their language on the monitor ("really fun") and tended to be less bored, less apt to arbitrarily conclude their stories (in the case of first graders using the Apple Writer) and enjoyed the quick production of hard copies for student sharing. Guidelines for a specialized elementary school word processing system are also provided.

Brandt, Ron. "On Reading, Writing, and Computers: A Conversation with John Henry Martin." Educational Leadership. 39, No. 1 (October 1981): 60-64.
John Henry Martin teaches very young children (K-1) in Stuart, Florida how to write using a computer. This delightful interview with him provides an overview of his methods for using the computer to "strip the school of its drudgery and inefficiency, elevating it to a beautiful sustaining function within our society." Martin's obvious excitement over his discovery and his sincerity in its propagation place this article a notch above the standard "why computers are just wonderful" endpiece.

Briand, Paul L. Technology in the Teaching of Composition. Bethesda, MD: ERIC Document Reproduction Service, ED 162 324, 1979, 8 pp.
The origins of today's CAI, according to Briand, lie back in the early stages of the media-in-education movement, including lectures on videotape and the use of character generators. He is optimistic about a future where computers evaluate student writing via a quick printout analysis of grammar, spelling, punctuation, and the syntactical qualities of coordination, subordination, and modification.

Chartrand, Marilyn J. and Constance D. Williams, eds. Educational Software Directory: A Subjective Guide to Microcomputer Software. New York: Monitor, Inc., 1982. Section H--Language Arts. 79-138.
A compilation of instructional software, the Directory includes nearly sixty pages of non-evaluative descriptions of about three hundred language arts programs, mostly of the drill and practice variety. More than half of the programs are applicable to composition instruction, ranging from elementary mechanics to a tutorial on parallel structure, sentence beginnings, and verbosity for high school students. Given the continuous development of new products and uncertain availability of old products this sort of compilation is probably useful only to scan the range of commercially avail-

able software and to trace trends in courseware development at a given point in time.

Dieterich, Daniel J. "ERIC/RCS Report: The Magical, Mystical Mechanical Schoolmaster, or The Computer in the English Classroom." English Journal. 61, No. 9, (December 1972): 1388-1395.

This interesting bibliographic essay came at a time when claims for CAI were becoming more muted (although Newsweek could still run a computer ad that described classroom computers as having "the stamina of Hercules, the patience of Job, and one pupil per class") and serious efforts were beginning to emerge in the area of tutorial and dialogue programs. Ultimately, Dieterich sees the success or failure of educational computing depending on how well teachers use it. If the computer can release the teacher from routine chores and provide more "quality time" for individual guidance and attention; if it can lead students to the higher order thinking funtions which are the real goals of education (and which only the human mind can do), then it will be a blessing to everyone involved. The author was not blind, however, to the problems of classroom computer use: cost, amount, reliability, maintenance, complexity, comfort, standardization, and content. More than ten years after the publication of this report, it is probably fair to say that the problems are still more prominent than the prospects.

Franke, Thomas L. "Computers and Writing Instruction: Issues for Policymakers." Pipeline. 7, No. 2 (Spring, 1982): 60-61.

Franke wrote this article in order to voice questions about the misuse of computer applications in writing. Some of his concern relates to shunting remedial students, and "unsatisfying" teaching areas like grammar and mechanics, to the computer simply because instructors do not like to teach them. More evocative, however, is Franke's concern that the computer may change the entire nature of how the teaching process occurs. Programs already exist that can perform checks for spelling, punctuation, and other editing skills, as well as provide organizational formatting. At what point do we stop teaching these skills? And do students with access to such programs have a competitive edge on students who do not have them? Franke draws some parallels to the introduction of hand-held calculators to mathematics classes, but the easy availability of computers and composing/editing software is unlikely to come as quickly as the calculator revolution. At

root is the question of what do students need to
learn how to do, for its own sake, and what can be
left to machines to do? These are questions that
few working in CAI instruction are asking, at least
in print, and Franke deserves credit for raising
them.

Goldberg, Maxwell H. Cybernation, Systems and the Teaching
of English: The Dilemma of Control. Bethesda, MD:
ERIC Documentation Reproduction Service, ED 067 689,
1972. (NCTE publication #01321). 70 pp.
This NCTE publication is one of the earliest
attempts (and probably still the best) to come to
grips with computer teaching technology in a theo-
retical framework. It is a thoughtful and stimulat-
ing essay that pushes past both the utopian rhetoric
of the computer advocates and the fear of total
takeover by computer-phobes to conclude that
computer-based English learning systems do have
potential in the classroom. But Goldberg believes
that some tough questions need to be asked about
the effects of mechanized learning on teachers and
students: Does it result in a mechanized view of
the process of learning? Should one teach composi-
tion on Skinnerian principles of stimulus-response
education, even if one can? It may be more than
just computerphobia to fear that computers might
serve human engineering goals that result in pre-
dictable standardized writing products. Goldberg
concludes his monograph by proclaiming that while
computers have an appropriate secondary role as an
adjunct to learning they can never be truly forma-
tive in any enriching way. This evocative work,
which contains an excellent bibliography on the
formative stages of CAI, should be read by every
person working in the field.

Jaycox, Kathleen M. Computer Applications in the Teaching
of English. The Illinois Series on Educational Ap-
plications in the Teaching of English. No. 19E.
Bethesda, MD: ERIC Document Reproduction Service, ED
183 196, 1980. 57 pp.
An Exxon Foundation Grant funded the research
resulting in this lengthy monograph on computer ap-
plications in use during the 1977-79 period. Jaycox
joins the call for computer literacy for humanists
and outlines various drill and practice and tutorial
applications. Although computer simulations are
best used in math and science instruction, she sees
an "encounter situation" use in English classes,
provided good models are developed. After discuss-
ing course management applications (test banks and
analysis programs) the author concludes with some

concise and useful methods for the evaluation of courseware; this latter section and an excellent bibliography constitute the strongest elements of the work.

Kearsley, G., B. Hunter and R. J. Seidel. "Two Decades of Computer Based Instruction Projects: What Have We Learned?" T.H.E. Journal. 10 (January 1983): 90-94 and (February 1983): 88-96.

This article, in two parts, provides a superb overview of the history of CAI development. Although not focused on composition CAI, it does discuss PLATO and TICCIT, the two large-scale language arts programs that have been used for writing instruction. Readers seeking an understanding of how computer-based writing development fits into the overall growth of computers in education can get a clear perspective from this detailed but not difficult article. A long list of references is provided which can promote further study in dozens of different directions.

Kreiter-Kurylo, Carolyn. "Computers and Composition." The Writing Instructor. 2, No. 4 (Summer 1983): 174-181.

As part of an entire issue given over to computers and writing instruction, Kreiter-Kurylo has written a brief summary article describing computer applications in grammar and syntax, rhetorical invention, and composition analysis. The work of a single researcher is uncritically discussed for each (Wittig, Burns, and Briand, respectively) but there is no bibliography or source list and the citations for the three authors are rather obscure, when more recent and better sources (especially for Burns and Briand) are available. No new arguments are found in this article but it does provide a brief overview of the potential value of computers for individualizing instruction.

Lawlor, Joseph, ed. Computers in Composition Instruction. Los Alamitos: Southwest Regional Laboratory, 1982. 88 pp.

These proceedings of SWRL's 1982 Conference on the Role of Computers in Composition Instruction consist of five papers, summaries of courseware demonstrations, and a review of SWRL's work in developing computer-based composition materials. Taken as a whole, the work provides a good introduction to the state of the research in early 1982. Two of the five papers deserve close reading: Earl Woodruff on "Computers and the Composing Process" and Alfred Bork's "Reactions" to the proceedings.

Woodruff reviews the potential uses of computers as exploratory tools in writing, and describes programs that can boost a student's analytic and comprehensive view of his text. Under the rubric of "consultative interaction," the computer as consultant, questioner, and collaborator is postulated. Bork, whose highly regarded work with educational technology is on display at the University of California at Irvine, closes the proceedings with a cautionary paper that reminds the participants of the "bad practices" that characterize much of what is now called computer-based learning: dependence on print techniques, discontinuous program timing, trivial content, and too little interaction. The remaining three papers include a short "state of the art" monograph by Robert Shostak, Hugh Burns briefly describing his rhetorical invention programs, and Ann Lathrop in a non-specific description of proper courseware selection procedures. The proceedings also include uncritical courseware demonstrations and an explanation by the editor of SWRL's problems in developing computer-based composition materials. A short but useful bibliography is appended.

Leibowicz, Joseph. "ERIC/RCS Report: CAI in English." English Education. 14, No. 4 (December 1982): 241-247.

Leibowicz has written an excellent "state of the field" article summarizing the best research to date. It is a pretty meager lot, which is in itself instructive. Four types of CAI in English are described (drill and practice, tutorial, dialogue, text analysis and editing) and some hope is held out that the prevalence of drill and practice programs is coming to an end and that more useful and interactive programs will be available in the future. The usual plea is voiced for acceptance of computers by the discipline as "a potent ally in the English teacher's struggle for humanistic education," but the author concedes that he found no evidence of improvement in student writing due to CAI. He did find, however, that CAI "did no harm" and that students seemed to like it.

Nold, Ellen M. "Fear and Trembling: The Humanist Approaches the Computer." College Composition and Communication. 26, No. 3 (October 1975): 269-273.

Humanists should approach the computer bravely, according to Nold, because it is especially suited for the patient repetition sometimes required to teach a concept or skill. The humanist should demand more, however, than simple stimulus/response programs and Nold finds these rare. Poetry and

topic-narrowing programs are modeled, but most computer software is labeled "unimaginative and dull," lacking in the "discovery and surprise" elements that might lead to interactive learning. In her caution not to oversell computers to her skeptical humanists, Nold strikes a careful balance between the zealots and the unconverted, and the result is a good introductory article for those seeking a quick overview of the topic. Many would contend that her statements are just as relevant years after she wrote.

Riskin, John. Written Composition and the Computer. Bethesda, MD: ERIC Document Reproduction Service, ED 078 678, 1971. 29 pp.
    This article, sponsored by the National Science Foundation and the Computer-Based Education Laboratory at the University of Illinois, sets in time the common view of CAI in the early 1970s: A tool of tremendous potential for use in conceptual comparisons and phonetic spelling judgments that can assist writers with audience, purpose, and organizational strategies. It concludes by explaining the DIALOGUE system, precursor to PLATO.

Stephens, Jessie Gunn. "What to Look for in Evaluating Software: A Checklist." The Writing Instructor. 2, No. 4 (Summer 1983), End-Paper.
    This is really only an end-paper (complete with perforations, for saving) to an issue devoted entirely to computer applications in writing; but it constitutes the best and most concise advice found for persons considering the purchase of specific software for use in writing instruction. It may raise more questions than it answers ("Avoid programs which offer entertaining rewards for undesirable behavior") but schools could do worse than to use it as a manifest for confronting software salespersons.

Withey, Margaret M. "The Computer and Writing." English Journal. 72, No. 7 (November 1983): 24-31.
    Withey has written a fine summary article intended for secondary-level English teachers who would like to know what all the computer-fuss is about. She categorizes applications into four categories which break down roughly into drill and practice, dialogues, tutorials, and word processing. Each is said to have value and deserves a trial by composition instructors. Various programs are discussed, with the author cautioning against the uncritical or uninformed purchase of software. Special attention is given to word processors and the

problems of incompatible languages. This is a very balanced and literate primer on the application of computers to writing instruction and makes an excellent starting point for new readers in the area.

II. DRILL AND PRACTICE

Anderson, Betty. Inexpensive Alternatives to Computers for
    Classroom Use. ERIC Document Reproduction Service,
    ED 196 006, 1980. 12 pp.
        In an apparently guileless report on what to do
    until the computers arrive, Anderson suggests vari-
    ous inexpensive devices that provide drill and prac-
    tice opportunities without a computer. In so doing
    she inadvertently (or so it seems) compels the
    reader to consider whether such devices are not
    perfectly acceptable alternatives to expensive drill
    programs in terms of motivation, self-correction,
    and reinforcement. Reading this simple article is
    enough to make one re-discover flashcards.

Breininger, Lynn J. "A Visit to Professor Cram: Attractive
    Computer Learning." College Composition and Com-
    munication. 34, No. 3 (October 1983): 358-361.
        Breininger's article recounts her efforts to
    create a set of drill and practice programs in
    grammar and vocabulary to which students will re-
    spond "like a conversation with a knowledgeable and
    witty friend." Although programmed reference to
    student names is far from unique, the use of materi-
    al taken from trivia books is, and produces some
    fairly lively exercises that should hold student
    attention. Similarly, colon and semi-colon exer-
    cises simulate a football game and might appeal to
    the Atari-generation in ways that workbooks never
    can. The root issue is whether such gimmick pro-
    grams improve learning and whether their appeal
    fades too quickly to justify their costs; the author
    makes no effort to deal with this.

Lyons, Thomas R. "Computer-Assisted Instruction in English
    Composition." Pipeline. 6, No. 3 (Fall 1981): 13-
    14.
        This brief summary article describes the
    computer-aided instruction component of the Univer-
    sity of Colorado's College Expository Writing Pro-
    gram (CEWP). CAI packages are used for remediation
    of basic writing skills in grammar, spelling, and
    punctuation. Although the materials were originally
    tied to the PLATO system, the College later aban-
    doned it to develop programs that could be used at a

wider variety of terminals. Lyons concludes that
students were generally successful in improving
basic writing skills with the computer programs, but
he also recognizes that new software must go beyond
simple binary exercises in mechanics if writing CAI
is to ever find a wider constituency. As an inter-
esting sidebar, the author reports substantial fac-
ulty resistance to the use of CAI in writing at the
University of Colorado.

Oates, William. "An Evaluation of Computer-Assisted In-
struction for English Grammar Review." Studies in
Language Learning. 3, No. 1 (Spring 1981): 193-
200.
    Efforts to test the effectiveness of CAI in
teaching basic English grammar, punctuation, word
usage, and spelling at Indiana University are de-
tailed in this article. Students in elementary
composition and newswriting courses using CAI were
given pretests and post tests and the results were
compared with those of students in courses not using
CAI. No conclusive evidence that CAI improved
learning was found. However, Oates points out that
computerized materials can give students in a learn-
ing lab far more remedial work in mechanics than can
most classroom instructors, and that both instruc-
tors and students appreciated the availability of
the CAI materials. The disappointing results of the
post test not withstanding, Oates feels that CAI is
an effective tool for teaching basic grammar review
to beginning writing students.

Paul, Terri and Don Payne. "Computer-Assisted Instruction:
Teaching and Learning from Basic Writers." The Writ-
ing Instructor. 2, No. 4 (Summer 1983): 193-199.
    The authors were involved in writing a remedial
skills drill and practice program (SPELLWELL) for
basic writers at Iowa State University. The process
used to develop the program is discussed at length
and the value of collecting data for program updat-
ing and improvement is lauded. There is no source
list or bibliography.

Schwartz, Helen J. "Monsters and Mentors: Computer Applica-
tions for Humanistic Education." College English.
44, No. 2 (February 1982): 141-152.
    In this oft-cited article, Schwartz articulates
the position of most humanists currently working
with computers in the teaching of composition: Com-
puters can never replace teachers, but for certain
uses and with certain students can be patient and
understanding aides, freeing the teacher's time for
more creative tasks. Of most interest are her use-

ful caveats for program purchases and her five-point litmus test for effective CAI. The latter includes respect for the human rights of the user, promotion of the individuality of the user, ease in use, support for the essential social character of human learning, and solicitation of user input for evaluation and modification of the program in the school setting. With better communication between programmers and users, the computer program may become a "kindly genie or mentor" rather than a "brutalizing monster." Much of Schwartz' discussion seems directed at drill and practice applications rather than the more advanced programs now coming to the fore; as such it seems oddly dated for a 1982 publication.

Southwell, Michael G. "Computers and Developmental Writing." The Computing Teacher. 10, No. 11 (November 1982): 34-35.

In the Spring of 1982, the Southwest Regional Laboratory (SWRL) in Los Alamitos, California held a conference focusing exclusively on the use of computers in the teaching of writing. Southwell was a participant at the conference and the editor of The Computing Teacher was impressed enough to request the author to summarize his presentation in this short article. It deals with teaching basic grammar to freshmen at York College (CUNY) in Jamaica, New York. CUNY's COMP-LAB materials were translated into a CAI format for microcomputers and, beyond the convenience and flexibility expected of auto-tutorial instruction, the computers added branching, patient and impersonal responses, and dynamics of presentation to the process. No conclusions are postulated, however, as to whether basic grammar competency was actually enhanced.

Southwell, Michael G. "Computer-Assisted Instruction in Composition at York College/CUNY: Grammar for Basic Writing Students." The Writing Instructors. 2, No. 4 (Summer 1983): 165-173.

This article systematically describes the COMP-LAB system used for remedial grammar instruction at York College/CUNY. Sample lessons from computerized modules are illustrated and claims are advanced for CAI in grammar as a greatly effective teaching device (documentation pending publication of a report under preparation). It is difficult to separate the auto-tutorial values of COMP-LAB from the computer applications, but Southwell does report that basic writing students show favorable attitudes toward working on the computer. Although critical of "mindless drill and practice" software, Southwell's

sample runs might appear to fit that category.

Southwell, Michael G. "Using Computer-Assisted Instruction for Developmental Writing." AEDS Journal (Winter 1982): 80-90.

In this detailed article Southwell argues that the computer may actually have the advantage over teacher-based instruction on remedial writing conventions and grammatical forms. By defining developmental as "teaching something new, rather than trying to fix something old and wrong," the author develops seven principles for remedial curriculum design that attend to positive learning results: a systematized program for delivering instruction and to monitor and test learning. Computers are appropriate for use in all seven principles because they lend themselves well to sequencing, checking retention and understanding, providing practice in concepts, and testing. Remedial learners are said to need the support system that good CAI can provide, to enjoy both the sense of control over their own learning and the privacy of communion with a computer terminal that eliminates personal embarrassment in front of teachers or other students. Sample software meeting Southwell's criteria is modeled.

Williams, Robert L. "Sentence Construction with a Computer." Creative Computing 6, No. 4 (April, 1980): 52-56.

This is a playfully written description of a verb-choice program developed by the author to encourage sentence construction within a sense of context. Abecedarian, as Williams calls his program, "attempts to show a portion of the English finite verb system at work." A sample running of the program is illustrated and the footnotes include the entire command list as well as suggestions for modifying the program so it can be run on other hardware. Readers interested in writing similar single-purpose programs would probably find this a useful model.

Zoller, Peter T. Composition and the Computer. Bethesda, MD: ERIC Document Reproduction Service, ED 127 611, 1975. 7 pp.

Zoller describes a summer session experimental program at the University of California at Riverside consisting of twelve grammar and syntax computer programs (developed by a local community college instructor) in a remedial English course serving fifteen students. The students, ranging from second semester freshmen to late seniors, completed at

least one program per week and met for a two-hour
weekly workshop. No systematic evaluation of the
computer component was attempted, since the time and
sample were both so small; however, the students
reported that they liked the activity of drilling
on the computer and the instructor felt that CAI was
useful in practicing some of the elements that com-
prise good writing.

III. TUTORIALS AND DIALOGUES

Beam, Paul. <u>COMIT English Module</u>. Bethesda, MD: ERIC
Document Reproduction Service, ED 167 189, April,
1978. 15 pp.
　　　In this paper presented to the Ontario, Canada
proceedings of COMIT (Computerized Multimedia In-
structional Television), the author describes a
computer-based tutorial developed for sophomore
English students enrolled in a required critical
analysis course. Students spent four to ten hours
on a module covering analysis topics dealing with
linearity, setting, imagery, and structure. In one
of the more interesting aspects of the program,
students were given an unpunctuated, unspaced ver-
sion of a passage from a literary work and then
asked to reconstruct it in a manner that would
improve comprehensibility by other readers. Other
programs (not all related to computer use) dealt
with simple levels of comprehension and grammar and
constituted basic English drill and practice that
seemed out of place in a sophomore critical analysis
course.

Burns, Hugh L. and George H. Culp. "Stimulating Invention
in English Composition Through Computer-Assisted In-
struction." <u>Educational Technology</u>. 20, No. 8
(August 1980): 5-10.
　　　When the definitive history of the role of com-
puters in composition instruction is written, this
article will probably open the "beyond drill and
practice" section. Captain Burns, an English pro-
fessor at the Air Force Academy, and George Culp of
the Computation Center at the University of Texas,
combined their disciplines to develop three programs
for pre-writing invention exercises. The programs
consisted of questions to the user based on either
Aristotle's enthymemes, Burke's dramatistics, or
Young, Becker and Pike's tagmemic matrix. The pro-
grams were administered and tested with care and the
results were systematically collected and recorded,
a rarity in the research done thus far in the field.
Although no definitive results were claimed, the
programs were reported to assist students to articu-
late, refine, and preserve their ideas and, even
without being content specific, questioning dia-

logues were judged useful to students in the pre-
writing stage. It can be argued that an able in-
structor could present such heuristics to students
without the help of a computer, and provide content-
appropriate examples to boot; but Burns and Culp
deserve credit for working beyond the common drill
and practice programs of 1977 (when they began).
Furthermore, the common computer values of self-
pacing and endless repetition opportunities, when
applied to these programs, may make them very useful
to certain students in certain circumstances. The
authors deserve pioneer status in the movement to
build useful interactive programs; this article is
worth reading for that alone.

Hinton, Norman. "CAI in Advanced Literature Classes."
Studies In Language Learning. 3, No. 1 (Spring
1981): 129-138.
    This article, included as part of an entire
issue devoted to the PLATO CAI system (and published
by PLATO's creator, The Language Learning Laboratory
at the University of Illinois at Urbana-Champaign),
describes Hinton's efforts to develop tutorial pro-
grams applicable to upperclass and graduate level
English. Using lessons on Tolkien, Chaucer, Yeats,
and others, he attacks the problem of narrow,
single-word response questions by providing greater
free response opportunities. The result is ques-
tions that are narrow enough to permit computer
response but open-ended enough to require intelli-
gently reasoned input that indicates both good
thinking and clear writing. Hinton's work does not
necesarily promote improved composition, but it is a
valid attempt to apply computers to student analysis
of literary works.

Horodowich, Peggy Maki. Developing Stylistic Awareness on
the Computer: A Tagmemic Approach. Bethesda, MD:
ERIC Document Reproduction Service, ED 198 530,
November 1979. 9 pp.
    Horodowich delivered this advocacy paper before
the 1979 Annual Meeting of the Midwest Modern
Language Association in Indianapolis. Citing the
values of both the Tagmemic approach and computer-
assisted instruction, the author argues that tag-
memic analysis via computer provides a vivid lesson
in clause analysis that confronts students with the
need to make the choices that result in a person-
alized writing style. Her Instruction Dialogue
Author Facility (IDAF) program provides instruction
on the four English clause types and then gives
students practice in recognizing the types and cre-
ating their own complex and compound-complex sen-

tences. A readout for the program comments is provided in the appendices.

Marcus, Stephan. "Compupoem: CAI for Writing and Studying Poetry." The Computing Teacher. 9, No. 7 (March 1982): 28-31.

Compupoem, a language arts game activity, is often cited as an important example of involving microcomputers in the composing process. This short article by the program's author is an excellent introduction to Compupoem. Although generally restrained in his claims, Marcus believes the program has a role in teaching writing as a discovery process by stimulating invention and encouraging word sensitivity. Students choose words in response to prompts for specific parts of speech and the computer then arranges the words into a haiku-like poetic structure. Since the vocabulary is extrinsic to the program, poet-authors have ranged from fourth grade to graduate school. Marcus confronts the question of who is the real poet, the student or the machine, by applauding the use of such concerns for classroom discussions, but it seems likely that the program's greatest value lies in teaching parts of speech and not poetry.

Owens, Peter. "Creative Writing with Computers." Popular Computing. 3, No. 3 (January 1984): 128-132.

With the boom in home computers has come a proliferation of popular periodicals aimed at the personal computer market; this article surveys creative writing software for that audience. The process approach to writing is briefly explained after which four programs are reviewed (Compupoem, Poetry Writing, Story Maker, and Cognitive Organizers) and the author tries his hand at developing his own instructional writing program for college students. None of the programs, including his own, are seen as particularly beneficial, although some kind words are spared for Compupoem. The software is seen as representing some "fresh approaches" to classroom writing, however, and more advanced hardware technology may eventually result in dramatically improved computer-assisted writing instruction.

Schwartz, Helen J. A Computer Program for Invention and Feedback. Bethesda, MD: ERIC Document Reproduction Service, ED 214 177, 1982. 10 pp.

Dr. Schwartz presented this heuristic for invention in a paper delivered before the annual meeting of the Conference on College Composition in San Francisco, March 1982. Through an interactive questioning process students were led to provide and

consider evidence in support of their own hypotheses. The program was tested in a 1981 World Literature class where some students used the program to write a timed in-class essay examination (not necessarily the best choice of tests) and some did not. There was no qualitative difference between the two groups, but the computer students did write more, and in greater detail. In a side note, Schwartz sees some value in the computer screen as a means for audience feedback to student writers.

Selfe, Cynthia A. and Billie J. Wahlstrom. "The Benevolent Beast: Computer-Assisted Instruction for the Teaching of Writing." The Writing Instructor. 2, No. 4 (Summer 1983): 183-192.

Wordsworth II, a composition software package developed at Michigan Technological University, is described and evaluated in this article written by two of its authors. The package consists of eight modules based on a process approach to writing and is intended to supplement traditional classroom instruction in composition. Each module focuses on a typical discourse assignment (narration, description, persuasion, etc.). The narrative module is described in detail and represents a fairly sophisticated dialogue program with an elaborate branching function. Although the authors tend to wax poetic, Wordsworth II does not go beyond the standard invention program developed five years earlier by Burns and Culp. That not withstanding, however, this article is worth reading for its detailed model of a tutorial/dialogue program now in use.

Sharples, Mike. "A Computer Based Language Workshop." Sigcue Bulletin. 14, No. 3 (July 1980): 7-17.

Sharples teaches in the Department of Artificial Intelligence at Scotland's University of Edinburgh and has experimented with using computers to teach language awareness and control to primary school children. Using three "average ability" boys, the author structured nine sessions of between one and four hours each in which the students used LOGO to generate poetry. Early sessions involved random strings of words and were followed by poems structured by parts of speech and, finally, "sensible poems" that showed some measure of sophistication. Sharples concedes that the study of generative and creative linguistics does not require computers, but he did find that the computer captured the boys' imagination and that the matching algorithm used for word choice in the later stages of the experiment would have proven too tedious to simulate by hand. The article concludes by describing additional pro-

grams being developed that would consist of natural
language generators focusing on stylistic peculiari-
ties such as repetition, punctuation, the use of
connectives and relative clauses, etc. These compo-
nents are seen as less context dependent than other
aspects, such as choice of description or narrative
style, and therefore appropriate for computer inves-
tigation.

Woodruff, Earl, Carl Bereiter and Marlene Scardamalia. "On
the Road to Computer Assisted Compositions."
Journal of Educational Technology Systems. 10, No.
2 (1981-82): 133-148.
Although burdened by a great deal of jargon,
this article provides an excellent description of
attempts to develop composing programs for
intermediate level grade school pupils. A first
study dealt with optional assistance commands which
responded to student requests for help with spell-
ing, content, sentence openness and abstract element
lists. The program was tested on a small group of
sixth grade students and did not result in improved
maturity in composing. The second study, building
on the results from the first, provided for more
active intervention in the composing process, but
its testing on thirty-six eighth grade students
resulted in complaints of excessive intrusiveness.
The authors conclude that children enjoy using a
computer to compose and that this enjoyment will
probably result in more writing than otherwise, but
that the tested programs do not necessarily result
in better writing. The article closes with a call
for further research on advanced-function composing
processes.

Wresch, William. "Computer Essay Generation." The Comput-
ing Teacher. 11, No. 3 (March 1983): 63-65.
The University of Wisconsin Center at Marinette,
through the work of Wresch and others, has acquired
a reputation as an early leader in the use of compu-
terized instruction. In this short article Wresch
describes the Essaywriter program he has developed
for Freshman Composition. By leading students
through a series of pre-writing questions, which
then are structured into an essay, Essaywriter
models a standard five-paragraph freshman composi-
tion (minus the conclusion). At the time of publi-
cation the author was working to improve the flexi-
bility of the program by increasing the range of
questions and permiting students to terminate the
process if they reach a dead end on their topic or
discover a better subject during program execution.
This is very much a work in progress, but Wresch

reports that UMCM freshmen enjoy using it, especially in groups of three or four students who "share the surprise" of the resultant essay.

Wresch, William. "Computers in English Class: Finally Beyond Grammar and Spelling Drills." College English. 44, No. 5 (September 1982): 483-490.

    For the first decade of its development, CAI meant drill and practice to most educators, according to William Wresch, director of a grant for CAI across the curriculum at the University of Wisconsin at Marinette. This single fact may do much to explain why, despite all the early hopes and predictions, "computers have barely entered the English classroom let alone revolutionized it." Although drill programs have the advantage of focusing on small chunks of information, involve direct learner activity, and provide immediate feedback on answers, they tend to be inflexible and uncreative. When PLATO, the massive series of drill and practice programs in accounting, biology, chemistry, English and math (developed by Control Data and the University of Illinois) was tested at five community colleges, "no consistent impact on either attrition or achievement" was found. The author sees the real future of CAI in the more complex (and also more expensive and difficult to write) tutorial and dialogue systems. Through the use of branching (tutorials) and natural language programs (dialogue) CIA can become a legitimate partner in composition instruction. A few of the pioneer dialogue programs, including Bishop (journalism composition, Michigan), Burns (pre-writing, Air Force Academy), and Lanham (stylistic analysis, UCLA) are modeled.

Wresch, William. Writing and Editing by Computer. Bethesda, MD: ERIC Document Reproduction Service, ED 213 045, 1982. 14 pp.

    In a paper presented before the annual meeting of the Conference on College Composition and Communication in 1982 (San Francisco), Wresch describes four computer programs (two pre-writing and two text-editors) that he believes can assist the writing process. None of the programs represent anything particularly new or inventive, although the paper does introduce Lanham's (UCLA) text editor and its relatively sophisticated ability to quickly provide statistics on sentence length, use of prepositions, "to be" verbs, and nouns ending in -tion, all in one program.

IV. WORD PROCESSING

Arms, Valerie M. The Computer Kids and Composition Bethesda, MD: ERIC Document Reproduction Service, ED 217 489, March 1982. 9 pp.

    The "computer kids" of the title of this interesting paper, delivered at the 1982 Annual Meeting of the Conference on College Composition and Communication, refers to engineering students at Drexel University who are taught that revision is to writing as debugging is to programming. Technical writing instructors use a word processing lab, including a system with an automated dictionary (SPELL), to encourage students to revise their writing and to show the special advantages of word processing for students who can expect to write products that will frequently require updating. It all sounds quite mechanical, with little concern for rhetorical instruction, but Arms seems to feel that technology-oriented students learn to write best by using a technological approach--something she describes as "the power of words in harmony with the power of the computer."

Arrants, Stephen. "Apple Writer II." Creative Computing. 9, No. 10 (October 1983): 101-102.

    Apple Computers are commonly found in both homes and schools and this review of the latest Apple word processing software would be important reading for anyone contemplating the purchase of a personal computer and its attendant software. Since software is generally not interchangeable it becomes as important to judge software as it is hardware before making any purchase decisions. As Arrants puts it, "Word processing is intensely personal. Loyalty to a package sometimes exceeds loyalty to one's political party." The author gives high marks to the redesigned (for the Apple IIe) Apple Writer II and discusses at length the improved features that make it easier to use and more functional for writers at all levels.

Bean, John C. "Computerized Word-Processing as an Aid to Revision." College Composition and Communication. 34, No. 2 (May 1983): 146-148.

    In a small study at Montana State University

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twelve faculty and four composition students used
the University's central computer as a word proces-
sor and found themselves "attracted to the new tech-
nology." Beginning writers were assisted in learn-
ing to revise initial drafts and showed improved
emphasis on reshaping ideas through successive
drafts, with less emphasis on grammar and lexical
substitution. With the elimination of the mechani-
cal difficulties of hand-written illegibility and
lack of time for extensive recopying, both students
and faculty revised more often and more willingly.

Collier, Richard M. "The Word Processor and Revision
Strategies." College Composition and Communication.
34, No. 2 (May, 1983): 149-155.
      Collier's hypothesis is that the use of a
computer-based text editor will significantly expand
the number and complexity of writing operations
(additions, deletions, substitutions, and reorder-
ing) and increase the domains upon which these op-
erations are performed (punctuation, words,
phrases/clauses, T-units, idea clusters, and par-
agraphs). The result would be improved revising
effectiveness. Unfortunately, Collier used only
four students ("of varied writing ability") to test
his intriguing theory and his results are interest-
ing but hardly compelling. The "superior writer"
did well and there is a general increase in manipu-
lation of material within the shorter domains, more
experimentation, and substantially more revision.
But there were no serious or elaborate additions,
and the most inexperienced writers carried forward
more surface errors, and recognized and corrected
fewer errors. Since none of the students were com-
puter literate they found operation of the text
editor's terminal stressful; those with the weakest
typing and text editing dexterity preferred hand-
writing.

Cronnell, Bruce and Ann Humes. Using Microcomputers for
Composition Instruction. Bethesda, MD: ERIC Docu-
ment Reproduction Service, ED 203 872, 1981. 10 pp.
      Computers can be used successfully to implement
a revision cycle in composition instruction, accord-
ing to this paper presented to the 1981 annual
meeting of the Conference on College Composition and
Communication (Dallas). Via a pattern of revision
from pre-written text, microcomputer feedback on
revisions, and analysis of writing errors with
suggested corrections, students will see successful
revision strategies modeled. The authors also sug-
gest computers to teach sentence combining and how
to generate and arrange content. Unfortunately all

of this is postulated with nothing more than intuitive evidence that it works to improve writing, and that it improves on conventional teaching strategies that deal with these matters. By 1981, one might expect such assertions to be supported with some reliable testing of the programs.

Daiute, Collete A. "The Computer as Stylus and Audience." College Composition and Communication. 34, No. 2 (May 1982): 134-145.

In this purely intuitive paean to the computer text editor, Daiute contends that the editor eliminates much of the tedium of, and therefore the resistance to, text revision, helps to remove writer's block, and provides a built-in audience response. Due to the impermanence of the computer-written word, authors are said to be more experimental in their approach to the task and children less tyrannized by tiresome and unrewarding tasks such as spelling and grammar checks and recopying. Since "people think fast and move slow" and computers do not think at all but "move fast and execute instantly" the text editor would appear to be the perfect device to take the drudgery out of writing by freeing short-term memory for the creative work of manipulating data and planning writing.

This article is convincing, but more research is needed before the text editor can be accepted as the unmixed blessing the author proclaims. We need to know if and how computer-writing changes an author's style and how it affects organization. Furthermore, there is some evidence (see Gould, "Composing...") that computer writing overloads short-term memory with the details of running the program and crowds out some of the ability to compose efficiently.

Gould, John D. "Composing Letters with Computer-Based Text Editors." Human Factors. 23, No. 5 (October 1981): 593-606.

Text editors may not be the unmixed blessing that some claim, according to this article written by an associate at IBM's Research Center. In a well-planned and detailed study, ten IBM research professionals, all computer-experienced and used to the text editor, wrote eight letters, four on the computer and four in longhand. The discourses were specified as message, routine, map, and competitive. In both modes the writers spent two-thirds of their time planning, but the text-edited letters required 50% more composing time, in part because of the large number of changes the authors made in formatting, text positioning, and modifying the formatted

versions. The comparative quality of the two sets
of letters was judged comparable. Gould concludes
that text editors may lead authors to adopt poor
composing strategies by dividing attention between
the act of composition and the mechanics of using
the editor.

Gould, John D., et. al. Writing and Following Procedural,
Descriptive, and Restrictive Syntax Language Instruc-
tions. Bethesda, MD: ERIC Document Reproduction
Service, ED 149 714, 1976. 28 pp.
    This paper describes research completed at IBM
to establish the ability of people who are not
computer literate to handle instructions written in
artificial, computer-compatible language. "Natural"
vs. restricted syntax language was used experimen-
tally with test groups of file clerks and compari-
sons were made on how well the instructions were
executed. Gould determined that there is no "na-
tural" form for expression of such matters: "Human
linguistic and cognitive systems are better charac-
terized as adaptive than as having strong natural
tendencies." Presumably, Gould's employers at IBM
were pleased to learn that it may not be necessary
to avoid restricted syntax language in computer
system design.

Heidorn, G. E., K. Jensen, L. A. Miller, R. J. Byrd, and
M. S. Chodorow. "The EPISTLE Text-Critiquing Sys-
tem." IBM Systems Journal. 21, No. 3, (1982): 305-
326.
    The IBM Corporation is developing a system of
software packages that would provide office workers,
particularly middle-level managers, with materials
to check grammar and style efficacy in drafts of
letters and memoranda. The system is not yet opera-
tional, but this detailed and technical article de-
scribes the intent of the software and the progress
of achievement after two years of work on the pro-
ject. The section dealing with the parsing of Eng-
lish sentences by the program provides a glimpse
into the problems programmers face when they attempt
to make natural language fit the limitations of a
restricted syntax computer context. Other sections
include reviews of grammar checking functions and
strategies for style processing. This article is
probably not of much interest to general readers,
but it does leave one with a sense of appreciation
for the complexity of detail that goes into develop-
ment of text-critiquing programs.

Leyenberger, Arthur. "AtariWriter: An Almost Complete Word Processor." Creative Computing. 9, No. 10 (October, 1983): 92-94.

This is a software profile and review of the Atari Corporation's latest word processing program. The reviewer found it easy to use with commands that are unambiguous and a menu that is simple to follow. New option functions such as Print Review (providing an actual screen format for what the printed page will look like) are described and a few drawbacks are delineated. Potential purchasers of word processing software would be well advised to check recent numbers of Creative Computing for excellent evaluative reviews.

Marcus, Stephan. "Real Time Gadgets with Feedback." The Writing Instructor. 2, No. 4 (Summer 1983): 156-164.

Marcus, whose work with COMPUPOEM is often cited, has written an article about the values of word processing for pre-writing activities. Words on television screens are neither print nor television and this new and uncertain status ("videotext") may have value in promoting experimentation with words and sentences by writing students. Freewriting and invisible writing are discussed, as are several software programs which use the CRT to possible advantage. The notes provide a useful bibliography.

Miller, George A. Automated Dictionaries, Reading and Writing: Chairman's Report of a Conference on Educational Uses of Word Processors with Dictionaries. U.S. Department of Health, Education and Welfare, 1979. Bethesda, MD: ERIC Document Reproduction Service, ED 189 624 (December 1979). 31 pp.

A DHEW booklet in three parts, these conference proceedings focus on the development of automated dictionaries, the use of word processors by school children, and the need for computer systems designed specifically for classroom use. The Report discusses video discs as well as computers and provides technical specifications for the computer hardware necessary for optimal educational use. Perhaps of most interest is the section detailing expectations for an automated dictionary based on current lexicographic, linguistic, and psychological research. This material is not readily found elsewhere and indicates that the "secretary's speller" now commercially available is far from adequate for school children learning to write on computers. The booklet closes with recommendations to the National Institute of Education calling for research and

funding toward the design and construction of hand-
held automated dictionaries and experimental word
processing systems.

Olds, Henry F., Jr. "Word Processing: How Will It Shape the
Student as a Writer?" Classroom Computer News. 3
(November/December 1983): 24-27, 74-76.
Five persons, including the president of a soft-
ware firm, two teachers involved in software devel-
opment, and two other teachers, met with the CCN
Editor (Olds) for a roundtable discussion on how
word processors are, or can be, used in classroom
writing instruction; additionally, this article
includes short statements from each participant.
The result is a thoughtful and incisive view of the
potential uses of word processing. The participants
vary in their estimation of the arrival time of
educational (as opposed to secretarial) word pro-
cessors, and all believe that teachers and adminis-
trators are currently ill-supplied with resources
for using the technology; but all agree that word
processing can develop better writing through im-
proved composing strategies and more thorough edit-
ing. Given sufficient access to user-friendly ma-
chines (especially in the early grades when students
are just beginning to write), instruction in typing
skills, and the appreciation of writing as a dynamic
process, the participants believe that a true revo-
lution in writing instruction can be expected. Stu-
dents will compose more freely, experiment with the
flow of ideas more easily, and edit and revise more
readily.

Overfield, Karen. "The Development of a Text-Editing
Program." Interface. 4, No. 4 (Winter 1982-83):
64-67.
Overfield agrees that teachers of business Eng-
lish need to determine the needs of local employers
and design their text-editing curriculum according-
ly. She found that employers expect more than sim-
ple skill facility; they also seek workers who know
standard English and have some communication skills.
The author discusses in some detail her approach and
methods for teaching text-editing, primarily to
secretarial science and business students, and con-
cludes that effective instruction in this area re-
sults in students who are well-prepared for assigned
tasks on their first jobs.

Schrodt, Phillip. "The Generic Word Processor: A Word-
Processing System for All Your Needs." BYTE. 7,
No. 4 (April 1982): 32-36.
Some humanists suspect that people who spend a

lot of time with computers, and particularly people who write about them, are devoid of a sense of humor. Schrodt, a political scientist teaching at Northwestern University, has written a jargon-filled and very technical-sounding article in which he describes...the use of a pencil for writing. Given that his prose mimics beautifully the writing found in dozens of computer science journals (the "character insertion subunit" is the end you sharpen, and the "block text extraction and replacement units" are a bottle of paste and some scissors), reading this article would be an excellent test of whether you are reading too many technical journals; if it takes you until the end to discover that the "GWP" is a pencil, you are.

Schwartz, Mimi. "Computers and the Teaching of Writing." Educational Technology. 22, No. 11 (November, 1982): 27-29.

A clarion call for computers as "the pencil of the future," this short article describes a program whereby Princeton University engineering students used computer writing/revising programs "to promote quick and clean drafts for sharing." Quoting E. M. Forster's dictum, "How can I know what I think until I see what I say," Schwartz applauds the move to a fluid, improvisational view of writing as a process of discovery and sees ease of computer deletion and revision as an important contribution to that movement. Computers are said to encourage more substantive revisions, reduce initial fear of making mistakes, and improve willingness to fully explore meanings, although no substantive evidence of these happy results are provided. One danger is also voiced: Computer printers make any writing look nice and this appearance may cover-up basic flaws in meaning--a phenomenon she terms "smokescreen revision."

Turner, Judith Axler. "Many Colleges Limit Students' Use of Central Computers for Writing." The Chronicle of Higher Education. 27, No. 15 (December 7, 1983): 1 ff.

In this front page article, Turner reports that "more and more students are discovering that the computer is the single greatest boon to writing, rewriting, and editing since the blue pencil," with the result that computer resources at universities are being strained and conflict is arising between traditional science students and new humanities users. A hierarchy of computer use seems to have arisen at many schools with mathematical, statistical, and data base users at the top, followed by

calculator-type manipulations, word processing, and with games at the bottom. Efforts at Yale and Princeton Universities are recounted as attempts to deal with the crunch, but most schools seem to place a low priority on word processor use at a time when students are clamoring for that function. Administrators are reported as seeing the purchase of personal computers by students as the best response to the new computer resources demands.

Wall, Shavaun M. and Nancy E. Taylor. "Using Interactive Computing Programs in Teaching Higher Conceptual Skills: An Approach to Instruction in Writing." Educational Technology. 22, No. 2 (February 1982): 13-17.

This is an "if only the computer could..." article focusing on text editing for young children. In order for computer technology to serve open learning theories and process models, more interactive and fewer static programs will be required. Sharing the common belief that computer editing can overcome the "mechanical aspects" of writing that deter proofreading, editing, and revision, the authors declare the need for a single-function text-editing system and model how one might work in a typical primary classroom writing instruction cycle. This advancement in technology is viewed as opening the way for computer instruction to facilitate "a feeling of being in dynamic communication" with the program.

Watt, Dan. "Tools for Writing." Popular Computing. 3, No. 3 (January 1984): 75-78.

This short article in a popular computer periodical reviews word processing software for both "tots and technicians." The Bank Street Writer, Talking Screen, and Quill programs are described in terms of their classroom applications. The article also discusses Bell Laboratories' Writer's Workbench but concludes that such advanced tools are not yet applicable to microcomputers and that, in any event, until personal computers are far more available no software will have much impact on the teaching of writing.

Watt, Molly. "Bank Street Writer." Popular Computing. 2, No. 10 (August 1983): 190-194.

The Bank Street Writer program, developed by Intentional Educations, Inc., and the Bank Street College of Education in New York City, represents a major breakthrough in word processing software designed specifically for school children. This article provides a glowing review of BSW via observation

of children using the program and through the re-
viewer's own application in writing her review.
Both adults and children were quickly taught to use
the program (although adults had a little harder
time) and both the home and school versions are
described. The availability of this inexpensive,
functional, and simplified software for word pro-
cessing constitutes the beginning of a true revolu-
tion in the teaching of writing and this consumer's
review of it does full justice to the event.

V. TEXTUAL ANALYSIS

Anandam, Kamala, Ed Eisel, and Lorne Kotler. "Effective-
ness of a Computer-Based Feedback System for
Writing." Journal of Computer-Based Instruction.
6, No. 4 (May 1980): 125-133.
Full-scale empirical research comes to a
computer-based writing instruction support system in
this study of Miami-Dade Community College's Re-
sponse System with Variable Prescriptions (RSVP)
program. RSVP was developed to provide individu-
alized feedback statements to freshmen composition
students in order to assist in correcting errors and
expanding basic skills competency. After a brief
description of the program the balance of the arti-
cle details a 1978 research project (the program
began at Miami-Dade in 1971) intended to test RSVP's
efficacy and student and instructor attitudes toward
it. Pre- and post-tests were administered to 74
students and prescriptions were produced on 361
essays. Substantial improvements in the test group
over a control group were documented on an objective
writing test (mechanics) but no discernible advan-
tage for RSVP was shown by the holistic grading of
essay examinations. Attitude surveys showed that
the students tended to like the "personalized" na-
ture of the feedback but instructors had mixed feel-
ings (although only four teachers were involved).
The study seems well designed and this article de-
scribes it with clarity, but readers interested in
simply knowing how RSVP is being used might prefer
to read the more cogent article by Kotler and Anan-
dam published in College Composition and Communica-
tion (October 1983).

Anderson, C. W. and G. E. McMaster. "Computer Assisted
Modeling of Affective Tone in Written Documents."
Computers and the Humanities. 16, No. 1 (September
1982): 1-9.
Why is some writing more interesting and endur-
ing than others? The authors of this highly techni-
cal and quantified article attempt to answer that
question by identifying, via computer item analysis,
the general factors determining the attractiveness
of aesthetic writing. The program stores in memory
a semantic dictionary containing the one thousand

most frequent English words for which differential scores exist on the factors of evaluation, activity, and potency (compiled by Heise, 1963). It was used to scan sophomore-level essays on the topic of best and worst future personal careers, and was applied to several pieces of classic children's literature. The study concluded that the affective tone of entire passages could be measured by computer-assisted collection of the semantic differential scores, resulting in an emotional tone score that correlated well with those papers and children's books that human readers found most affecting. The authors conclude that their program could be useful in selection of textbooks (choose texts with high emotional interest) and, more chillingly for the future of rhetoric, suggest that speeches, memos, and advertisements be subjected to the program to ascertain whether "they will have the intended impact."

Bishop, Robert. Adapting Computer-Assisted Instruction to the Non-Programmer. Bethesda, MD: ERIC Reproductive Document Service, ED 081 231, 1973. 16 pp.
    Bishop describes his program for computer analysis of student writing in journalism and English classes in this paper presented to the Conference on Computers in the Undergraduate Curricula, held in Claremont during June 1973. The program scans student writing for syntactic patterns specified by the author and comments on accuracy and style; the result is said to be an accurate accounting of a paper's strengths and weaknesses. In an unusual feature for such a paper, Bishop outlines three fairly easy steps for programming his system: listing key words and patterns, identifying the conditions where comments should appear, and translating the conditions into IF-THEN statements. For those who are interested this makes a good elementary exercise that can be tried on any microcomputer.

Daigon, Arthur. "Computer Grading of English Composition." English Journal. 55, No. 1 (January 1966): 46-52.
    This article describing the CEEB-sponsored Project Essay Grade is a gem for researchers looking for the scholarly origins of computerphobia among composition instructors. Originally a paper delivered before the Boston convention of NCTE in 1965, Daigon makes elaborate claims for the benefits of computer-read essay systems. The Essay Grade program identified and counted preselected combinations of graphemes which were considered to be indicative of strengths and weaknesses in the papers. The machine's judgment correlated well with composition evaluations given by human graders dur-

ing the nine months of research. Daigon anticipated two adverse English teacher reactions to his conclusions: fear of the abdication of human prerogatives, and prejudices against the truly creative writer. He dismissed the former on the basis of progress ("exaggerated nostalgia for a simpler past") and the latter on the grounds that teachers harbor their own prejudices against creativity ("overburdened or untalented teachers who merely scan a paper, assign a number or letter grade, and write an innocuous comment or two"). To Daigon, the failing in a human contending with student compositions is that the person is not enough like a machine, which can "accurately and consistently respond to discernible elements of style without tiring perceptibly." He looks forward to seeing the machines made more human in their responses to substantive ideas and organizational development, perhaps with a computerized thesaurus to check content, and key words and phrases to detect organization. The author's hopes are probably still harbored by many computer technicians and school administrators but no one is so impolitic anymore as to seriously make such claims or so viciously attack the esteem of an entire profession. Daigon (an education professor at the University of Connecticut) drew battlelines early, and in so uncompromising a way, that his effects might still be felt today among late-career English instructors who came in contact with him in 1965-66. This is a must-read article.

Finn, Patrick J. "Computer-Aided Description of Mature Word Choices in Writing." In Charles R. Cooper and Lee Odell, Evaluating Writing. Urbana: NCTE, 1977: 69-89.

Those who entertain only moderate expectations for computers in the teaching of writing often point to its uses in composition's small components: Computers may not be able to produce better writing but they may help teach some of the tools that go into better writing. Under the defensible assumption that word choice is related to writing maturity, Finn describes a word choice program, based on a standard frequency index and with some control for topic vocabulary. The program identifies tokens (words) and types (different words) for student essays and produces a list that can be judged for word choice maturity, an admittedly subjective determination. Eventually, Finn hopes to produce a program that will be able to prod word choice revisions, although that capacity was still undeveloped six years after the publication of this article.

Frase, Lawrence T. "Ethics of Imperfect Measures." IEEE Transactions on Professional Communication. 24, No. 1 (March 1981): 48-50.

Frase, a psychologist at Bell Laboratories, is often found in the literature dealing with Bell's "Writer's Workbench." This article is one in a series discussing readability formulas and argues that readability must not be confused with comprehensibility. The goal of improved writing is to make for more comprehensible reading and while the Workbench serves that end by identifying misspelled words and awkward phrases and sentences, and by measuring text abstractness, such measures do not by themselves provide clear guidelines for improving texts. This article is probably most useful within the debate raging over the use of readability formulas by reading instructors; Frase clearly stands with the holistic approach to text evaluation and, one may assume, the process approach to writing instruction.

Frase, Lawrence T., Nina H. Macdonald, Patricia S. Gingrich, Stacey A. Keenan, and James L. Collymore. "Computer Aids for Text Assessment and Writing Instruction." NSPI Journal. (November 1981): 21-24.

The "Writer's Workbench" programs developed by Bell Laboratories constitutes the state of the art in computer text analysis and this is by far the best article to date describing the programs, the planning behind them, and possible instructional uses. The WW developed out of a very practical need by Bell technicians to simplify their work on documentation technology, but resulted in programs of advanced sophistication for editing and textual analysis and which show promise for higher-level learning applications in the future. The structure of the program sets is listed and the developmental rationale is explained; also, tests for validity and user response are provided. Of most relevance to composition instruction, however, is the article's concluding section on instructional applications; reasonable applications for tutorials, style modeling, and tutorial interactions are suggested. The reference list is comprehensive and provides readers who are interested with the resources to trace the intellectual roots of this complex and important development in computer-assisted writing.

Hiller, Jack H., Donald R. Mascotte, and Timothy Martin. "Opinionation, Vagueness, and Specificity-Distinctions: Essay Traits Measured by Computer."

American Educational Research Journal. 6, No. 2 (March 1969): 271-286.

Building on the work of Ellis Page, the authors attempt to develop computer-usable measures that can provide feedback to both teachers and students as part of general writing instruction. In short, the hope is to promote computerized essay grading from a placement or evaluative device to an instructional tool. Three stylistic admonitions, taken mostly from the 1965 edition of Strunk and White, The Elements of Style, were chosen (avoid excessive opinionation, avoid qualifiers that promote vagueness, and use "definite, specific, concrete language"). By programming the computer to find (or detect the absence of) specific words or phrases that relate to the admonitions, the authors hope to identify for students and teachers how any essay can be improved. Using 256 secondary-level research papers written years earlier for another study, the program was tested and found to conform to "common sense" predictions about good writing and the computer's ability to use specified words or phrases (i.e., "I think" as an indicator of opinionation) to judge stylistic traits. The authors conclude with some warnings about the usefulness of their study, but are basically confident that computers can be used to promote stylistic writing instruction if programmed properly.

Kiefer, Kathleen E. and Charles R. Smith. "Textual Analysis with Computers: Tests of Bell Laboratories Computer Software." Research in the Teaching of English. 17, No. 3 (October 1983): 201-214.

One of the best known and most promising of computer editing software systems, Bell Laboratories' "Writer's Workbench," was tested at Colorado State University and the results are reported in this excellent article. Students entered their essays on the Bell system and then used a series of programs as editing/revision aids: SPELL, DICTION, SUGGEST (a substitution program), and STYLE (analysis). Thirty-eight freshman-level composition students completed the Workbench test group sections. These students "overwhelmingly agreed that using the computer was enjoyable, easy and not frustrating" and the study determined that the computer programs resulted in improved papers. The authors conclude by affirming the value of textual analysis as a teaching tool in composition and maintain that the computer is the best medium for that tool.

Kotler, Lorene and Kamala Anandam. "A Partnership of Teacher and Computer in Teaching Writing." College

Composition and Communication.   34, No. 3 (October 1983): 361-367.

Two Miami-Dade Community College instructors, working on an Exxon Grant, attempt to use microcomputers as a prescriptive agent in this article detailing the RSVP Feedback Program. Instructors evaluate a paper, based on its readability, label it at one of four levels of proficiency and identify on scantron cards specific errors warranting feedback. The computer then provides a detailed diagnostic letter to the student, giving examples of suggested remediation. RSVP was field tested at five community colleges in 1979 with the reported results that "teachers and students alike endorse the capacities of instruction and organization inherent in computer-based instructional systems such as RSVP." Unfortunately, that ringing endorsement is not accompanied by any genuine testing. We know that students usually enjoy their first brush with computer instruction (the novelty effect) and since the program was field tested over only one semester, the long-range efficacy of RSVP must be considered unproven.

Page, Ellis B. "The Use of the Computer in Analyzing Student Essays." International Review of Education. 14, No. 2 (1968): 210-224.

Page perceives the problem of essay evaluation as "the problem of transforming a string of input symbols into some appropriate string of output symbols." This could translate into the sequence letters in a student essay (input string) resulting in a letter grade or comments (output string). The essay as essentially a physical object, with which the computer can appropriately deal, is then discussed in terms of both philosophical and practical ramifications for writing instruction. Essays are divided into considerations of content and style and a series of proxes (simulation of a human product) and trins (intrinsic variables that interest human judges). Based partly on the five principal traits believed important in essays (as develeoped by Paul Diederich for the Educational Testing Service), a program was developed and tested for validity against a panel of human judges ("32 highly qualified English teachers from the schools of Connecticut"). The results showed favorably on the computer's ability to simulate expert human judgment on the five principal traits of good student essays. Page looks forward to the day when computers can read ordinary handwriting, although he also paradoxically calls for "low-cost, noiseless, power-driven character printers" to emancipate primary school children from

"the inefficient and painful problems of handwriting."

Schwartz, Helen J. Teaching Stylistic Simplicity with a Computerized Readability Formula. Bethesda, MD: ERIC Document Reproduction Service, ED 196 014, 1980. 14 pp.

    In this paper presented to the 1980 meetings of the American Business Communications Association, Schwartz describes a study aimed at facilitating stylistic simplicity appropriate to audience in student writing. Two business and technical writing classes received identical reading assignments, classroom activities, and writing assignments. Students in one class, however, received feedback on their writing from a computerized readability formula program and then revised their work. The test group did score higher on the stylistic simplicity scale but this did not correlate with overall writing achievement on the assignments. The author concludes that her program would be most useful for students who usually write too complexly for their audience.

Slotnick, Henry B. "Toward A Theory Of Computer Essay Grading." Journal of Educational Measurement. 9, No. 4 (Winter 1972): 253-263.

    This essay is so quantatively technical as to be virtually unreadable by persons not fully conversant with such measures as eigen values, six-factor orthogonal and oblique solutions, and rotated solution proxes. Slotnick shows why computer measurements work as approximations of the attributes of good writing that human judges look for. Via principal component analysis, a series of "trins" (extrinsic factors such as quality of ideas, spelling, diction, etc.) and specific qualities (subsets of factors relating to the trins) were identified and translated into characteristic proxes (aspects that the computer could count and thereby use to evaluate the trins). The result of these discussions, for most readers, will probably be a vague appreciation of how computers are able to approximate human graders of student essays. Readers who are more familiar with statistical measurements may find it interesting to evaluate the validity of Slotnick's tests.