ABSTRACT
          Articles in this journal issue focus on computer
applications for the English classroom. Following an introduction
(Ken Davis), the seven articles discuss the following topics: (1) the
computer as an administrative, instructional, and research aide for
English teachers (Brian D. Monahan); (2) computer technology and the
writing teacher (Sandra J. Balkema); (3) the full range of computer
applications in the composition classroom (Jim Karpen); (4) word
processing as a tool for writing (Margaret L. Mittricker); (5) the
computerized text and its readers (William Dennis Horn); (6)
computers, communication, and taking the initiative (Sally Terango);
and (7) English teachers as computer leaders (Robert Lucking).
(HTH)

Kentucky English Bulletin

THE
COMPUTERIZED
ENGLISH CLASS

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KCTE EXECUTIVE COMMITTEE

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INTRODUCTION:
THE COMPUTERIZED ENGLISH CLASS

Ten years ago this November, I drove from Ann Arbor to my first NCTE convention, in Philadelphia. My companion on the trip was my friend, collaborator, and fellow graduate student John Hollowell, and we passed some hours on the Ohio and Pennsylvania Turnpikes fantasizing about a subject that was just on the edge of science fiction: computers.

Ten years later--but much sooner than we could have imagined--I'm sitting in my home at a 25-pound machine, composing this introduction by letting my words chase a blinking green cursor across a small video screen. A revolution has happened. And fast. So fast, in fact, that the topic of this issue--a topic that seemed "hot" a year ago when I announced it--now seems a bit cooled.

But cooled just enough, I hope, to allow a kind of good sense and objectivity that has been understandably lacking in many of the first wave of enthusiastic reveries on educational computing. In this issue's first article, Brian Monahan, of Longfellow High School in Yonkers, NY, demonstrates that kind of good sense in surveying broadly the uses of the computer for English teachers.

The next three articles specifically treat applications for the teaching of writing. Michigan's Sandy Balkema provides a particularly valuable tutorial for the composition teacher, Bowling Green's Jim Karpen wisely reminds us of the breadth of possibilities, and Westwood, NJ's Margaret Mittricker reports a classroom teacher's success.

William Horn, of Clarkson College, next bridges writing and reading with a fascinating discussion of the forms of text made possible by the new technology, and EKU's Sally Terango shares an elementary-school unit on computer literacy that doesn't even require a computer. Finally, Robert Lucking, of Valparaiso, points ahead to the special role of English teachers in the computer revolution. Thanks to him and to the other contributors.

Paradoxically, of course, the medium of this issue is far behind its message. At the very time we are discussing new possibilities for text production and distribution, rising costs and budget cuts have forced the Kentucky English Bulletin into relatively primitive publishing methods--primitive not in relation to most other NCTE affiliate journals but surely in relation to the journal we'd like to be. While the KCTE Executive Committee has voted unanimously to continue present printing methods for the next year, we are exploring technological alternatives and hope that they will afford us a more attractive publication in the near future.

Meanwhile, we take pride in the substance of the publication. Last fall's issue on "The Responding Reader" was one of about half a dozen affiliate publications newly selected for inclusion in NCTE's 1983-84 catalog, and the coming Winter issue on The Paideia Proposal has already begun to attract national attention, especially in light of Mortimer Adler's selection as the keynote speaker for the 1983 NCTE convention. So look for that issue in your mail in November.

The last page of this issue announces topics for our 1984-85 publishing year. We welcome your submissions.

Ken Davis

THE COMPUTER AS AN AIDE
FOR THE TEACHER OF ENGLISH:
ADMINISTRATION, INSTRUCTION, RESEARCH

Brian D. Monahan
Longfellow Middle School, Yonkers, New York

For thirteen years I was an English teacher. Now, I'm
into high tech and I don't teach anything. Actually, there are
probably several thousand students in various parts of the
country who would say that's nothing new. One of the things
about using computers in education that has always surprised me
is that there are a number of teachers who do not use computers
because they are afraid of the machines. Frankly, in the
schools in which I have worked we've always been so afraid of
the kids that we didn't have time to be afraid of anything else.[1]

Things in the field of educational computing are not what
they should be. I am in the midst of writing a textbook for
teachers who are interested in educational computing. My wife
is illustrating it. She doesn't understand computers at all,
nor does she have any desire to. She does, however, have some
feeling for the world of educational computing, since she
answers my phone calls, reads my mail, edits my articles on
educational computing and reads the accompanying rejection
notices. Based upon her experience, she suggested the following
illustration: a picture of a computer and a group of teachers.
The teachers are stepping over one another to get to the
computer.

This paper explores some of the ways that the computer can
be used by those involved in providing English instruction in
schools and colleges. There is good news and bad news. The bad
news first. Most of the currently available instructional
software for use in English classrooms is bad news. It is, of
course, very fashionable today to criticize software. My
perception is that the lack of good instructional software may
be best attributed to the nature of our discipline, rather than
the greed or incompetence of software developers.

Instructional software is usually classified under one of
three headings: drill and practice, tutorial, and simulation.
Drill-and-practice software provides students with a kind of
computerized workbook. In a drill-and-practice program,
students are provided with a question which is answered,
usually by typing a letter, word, or number. There is, in fact,
a great deal of excellent drill-and-practice software available
for use in English classrooms. Many of those programs contain
information that is clearly presented through the use of
attractive and often sophisticated graphics. The problem comes
with what the programs teach. For a teacher who feels that
students should not be allowed to write until they have
mastered the eight parts of speech, there is enough software
available so that they will never have to teach again.

The second type of software is called tutorial software.
It differs from drill-and-practice software in its use of
branching. More effort is made to avoid teaching students what
they already know. In addition, many tutorial programs tend
to be more "open ended." In English and language arts, those
programs which are open ended enough to allow students to type
in their own responses can provide students with a way of
doing some computerized note-taking. Of course, one of the
problems in allowing students to use their own words is that
it is possible to check only on the quantity of their responses
rather than their quality. For example, a tutorial program to
help a student develop an outline for a composition might
prompt the student to state the main topic and then list three
points that should be made about that topic. If the student
plays by the rules, all goes well; however, suppose the student
types in garbage. By now, most of us are familiar with the
saying "garbage in, garbage out."

The third and most exciting type of programs are simula-
tions. A simulation is a program which creates a "situation."
That situation may be representative of the real world or it
may be a type of fantasy. Good simulations require that
students use problem solving strategies, among the most dif-
ficult strategies to teach. I see great possibilities for
computerized simulations in helping students to understand
literary situations. Unfortunately, I've yet to see any such
simulations.

In general, what I have seen in the way of software for
use in English classrooms has been flawed. I suspect that the
software may get better, but it is possible that our discipline
does not lend itself well to CAI. Nevertheless, we should not
discard the idea of using computers. The computer can also
function as a tool, and it is as a tool, I believe, that the
computer holds its greatest value. For English teachers and

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supervisors, the computer can serve as a tool for administrative
tasks, for instruction, and for research.

Let us look at the administrative tasks first. Whenever
I address a group of English teachers on the subject of using
computers, I know what they're thinking. Each teacher in front
of me has a thought that goes something like tnis: "Each week
I have to grade 150 essays, each written in a scrawl that only
a mother would consider readable. If you're so smart, tell me
how the computer can help me to deal with them." Well there are
some possibilities. In the ideal situation, all students will
know how to type. They will have access to microcomputers,
word processing software, and printers. The students will com-
pose and edit their papers, use a spelling checker program to
make sure they have no misspellings, and print out final copies
to submit to the teachers. (Of course, some of them will still
tear pages out of their spiral notebooks to put in the printer,
just to maintain the ragged edges effect.) In this ideal
situation, teachers of English will at least be freed from
reading an indecipherable scrawl that is full of misspelled
words. At Iona College, where I teach in the Computer Science
Department, almost all of the students majoring in computer
science use SCRIPT, a word-processing program which can be
accessed on school's main-frame computer, to write and edit
their papers their humanities and social science courses.
The students majoring in English--I believe there still are
some--of course don't know how to use the equipment. They're
still handwriting their papers or banging them out on manual
Royal typewriters.

Since we a: dealing in ideal situations, let's take the
concept of what happens when students have access to word
processors one step further. This is a step which most English
teachers will find appalling. Why not have the computers grade
the students essays? Teachers can simply collect floppy disks
from each student, slip them into machines, and they'll come
out graded. They can do it while watching "Dynasty." Believe
it or not, the technology to grade essays by computer is
available. In fact, it was available in 1966.[2] Of course, a
computer cannot grade based upon the effectiveness with which
ideas are presented cr the quality of those ideas. What it can
do is look at the length of words, the length of sentences, and
the length of a paper. Using those data the computer can come
up with scores that correlate quite positively with scores
arrived at by those who have been trained in the use of
holistic scoring. Obviously, and fortunately, this technique
has one rather large flaw. Once students learn the rules of
the game, then all they need do is write nonsense, as long as
it is lengthy nonsense.

Back in the real world, many readers probably are not in a situation in which all students have access to computers. Well, even if a faculty member has access to even one microcomputer, there is a technique which can help in dealing with the paper load that most teachers of English face. The suggestion comes from Dr. Timothy Little of Michigan State.[3] Dr. Little points out several facts of life about teacher comments on student papers:

1. Comments tend to be repetitious, across students and across assignments.

2. If comments are to be helpful and accurate, their length often rivals the length of the original paper.

Word processing software has the potential to help remedy the situation to some degree. All word processing programs provide some way of defining blocks of text. For example, SCRIPSIT, a word processing program for use with the TRS-80 computers, allows the user to define up to 23 blocks of text, identifying each with a letter of the alphabet. The length of a block may vary from several words to several pages. With the press of one or two keys the user can bring any block of text to the screen, combine it with other blocks and print it out as part of the comments that the student will receive. For example, I just finished grading a set of research papers from a freshman composition course. I can safely say that nearly a third of the papers deserved a comment something like this: "While you did use the minimum number of sources required, you used neither the best sources, nor the most recent." Another that could have been repeated even more frequently goes something like this: "Why didn't you proofread your paper before handing it in?" I'm sure all teachers of English recognize as they grade papers that there are certain comments that begin to sound familiar after a while. Of course, a computer printout attached to each student's paper of very general comments is not the complete answer--teachers will still want to make specific comments on each paper, but perhaps they will be less likely to leave a comment out because they can't stand to write it again.

I see value in the procedure I've just discussed, both administrative and educational. Not only does it make life easier for the teacher, but it provides a permanent record of teacher comments. Thus when you get the feeling that a student has used too many one-sentence paragraphs before, you can search the disk for previous comments, give the student a D-, and then stop making comments since they are not being read.

The text-processing capabilities of the microcomputer go
beyond administrative tasks. It is as an aide to composing for
students that the computer is likely to have the greatest im-
pact. One of the programs mentioned most often by English and
language arts teachers is Bank Street Writer--a word-processing
program designed for classroom use. The prompts at the top of
the screen allow students to use the word processor without
having to remember a lot of commands. The instructional
materials provided with the program offer suggestions for
incorporating it into the curriculum. An informal study which
I completed in Yonkers two years ago suggested to me that the
use of the microcomputer as a word processor has the potential
to foster revision, even in the work of basic writers.[4] Most
of the articles that I have seen on the use of word processing
in the classroom (my own included) were based upon studies that
were done in an informal, rather unscientific manner. Most
reported positive results, with students writing more, revising
more, and enjoying it more. Certainly, more research on the
results of using the word processor in the classroom is needed.
Those who have suggested that word processing is the answer to
all composing problems are basing their conclusions on research
that must be considered tentative, and in some cases, flawed.
Things are never that simple. A study by Gould reported that
texts composed on a word processor require 50 percent more time
to compose.[5] Of course, it is possible that students spend
more time on their papers because they enjoy using the machine.
Undoubtedly, we will see the microcomputer used as a word
processor more frequently in the future. While research on the
use of the word processor in the teaching and learning of
writing should be characterized by the same rigor that
characterized research on the writing process done in the last
decade, there is one reason that seems to suggest that the word
processor is here to stay: teachers enjoy using it, and so
do students.

The text-processing capabilities of the microcomputer make
it important for research--as a tool for research and as an
object of research. Colette Daiute at Teachers College is
doing exciting research on the writing process.[6] That research
makes use of the computer's ability to keep track of keystrokes,
thereby charting and quantifying a student's writing process.
Such research will do a great deal to define how the word
processing capabilities of the microcomputer will be used in
English classrooms in the future.

One of the uses to which we as teachers and supervisors of
English and language arts should be putting the computer is the
electronic bibliography. Any teacher who has recently attended
graduate school knows the feeling of elation that comes with

having typed the last word on the last page of a lengthy
research paper and also knows the feeling of intense depression
that comes with the realization that one still has to type the
bibliography using a format that was designed by people who
participated in the Spanish Inquisition before going to work
for the MLA. Any teacher who anticipates spending two decades
in graduate school, as I do, might wish to reflect on the
benefits of having to type each bibliographic entry only once.
In addition, the creation of a bibliographic data base with
accompanying keywords allows one to retrieve citations on a
particular topic with the press of a few buttons. For example,
a scholar whose research interest is Hemingway might want to
use the keyword women to categorize all the articles he or she
had read dealing with Hemingway's treatment of the relationship
between men and women. Such a procedure would not only provide
almost instant access to the appropriate citations, but would
also free the user from the drudgery of typing the citations
of articles chosen for use.

To some, a computerized bibliography of the type being
discussed here might seem like the epitome of "high tech." I
guarantee that for today's students it will seem a natural and
quite normal application of computer technology--a use no more
unusual than my tenth-grade English teacher's suggestion to
keep in the back of my notebook a list of all the words I mis-
spelled. One school district, the Mountain View--Los Angeles
district, is giving high school students a headstart on such
a project by putting the contents of the library "on-line" so
students can use terminals in the library to locate appropriate
materials. The district anticipates that one year from now a
sufficient number of students will be equipped with home
computers and modems to make it feasible to make the service
available on a dial-up basis.[7]

What is the next step for an English educator who has taken
a course or a few workshops in BASIC, has learned something
about software evaluation, and wishes to further explore the
uses and potential of the computer? I see three possible
directions: one is to learn more BASIC, a second is to learn
another computer language, and the third is to become
acquainted with the fascinating world of telecommunications.

Learning more BASIC, or advanced BASIC (that seems like a
contradiction), means learning the file-handling capabilities
of the language. BASIC allows for two types of files, random
access and sequential. Random access files allow records to be
located through the use of an index or key. Sequential files
must be read, in order, starting at the beginning. It is only
through the use of files that programs can be written that will
store data about student performance. Without such data,
the only way a teacher can monitor students' progress is
by standing over them while they are using a program. In

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addition, data files are program-independent--they can be
accessed and used by many different programs for many different
purposes, assuming that the programmer knows how the file is
set up.

A second suggestion for the English educator who wishes
to go beyond BASIC is to learn another computer language.
Certainly there are many from which to choose. Over thirty
computer languages can be termed "widely used" today. However,
since most educators plan to use microcomputers, those choices
are currently limited to the languages available for micro-
computers: COBOL, FORTRAN and Pascal. COBOL is a fine
language for business applications, so if one is planning on
leaving education and going into the real world, he or she
probably should learn it. FORTRAN is the oldest of the high-
level compute, languages. Most of its applications are in the
scientific/mathematical fields. Actually, very little new
software is being written in FORTRAN and probably none that
would be of interest to English educators. That leaves Pascal,
which is probably the appropriate choice. Pascal was intro-
duced as a programming language in the early 1970's to meet the
need for an instructional language for the training of begin-
ning programmers. Its combination of structural control
facilities, powerful data structures, and simplicity of expres-
sion make it an excellent choice for those with little or no
programming experience. Since the College Board has elected
to use Pascal in its advanced placement computer science course,
we are likely to see an increasing number of people who will
be familiar with it. Fortunately, good versions of Pascal have
become available for most of the popular microcomputers on the
market. Pascal provides a structured approach to programming;
it forces the programmer to adopt clean and efficient patterns
of thought. As I write that--"Clean and efficient patterns of
thought"--I can't help but wonder, isn't that what teachers of
English have been striving to teach? I'm reminded of something
that Kara Gae Wilson wrote in the English Journal, "The tools
of the computer literate are those reasoning skills which have
been taught and are being taught by English teachers."[8]

My final suggestion is that teachers become involved in
the world of telecommunications. The future belongs to
machines which attach to the telephone. Success will depend
upon computer links, not computer technology. We are
approaching a world in which we will be able to take advantage
of one another's knowledge. And after all, isn't that what
education is about?

Educators with terminals and modems (devices which allow
computers to hook into telephones) might wish to consider

Educators Special Interest Group, which can be accessed through
the Compuserve Information Network. The network contains
bulletins of interest to educators about such things as con-
terences, new software, and organizations of computer-using
educators. Another feature of the Special Interest Group is
that it allows users to send and leave messages. Those messages
may be general or specific, so an educator might leave a message
for another educator or might leave a question to be read by the
general membership in the hope that someone can give an answer
or provide information. Usually someone can.

This paper would be incomplete if it did not address a few
words to those who are thinking of getting involved in com-
puting, either as individuals or through their roles in their
schools. Unfortunately, some educators have interpreted the
explosion of new computer knowledge and products as a sign that
they should wait before making purchases, either because they
feel that the prices will come down or because the new equipment
will be better. The prices probably will continue to come down.
They will probably not come down enough to justify doing without
word processing for the next few years. The machines will get
more powerful. However, the machines on the market today, I
think, are more than powerful enough for the uses that most
English educators have in mind and for several that they don't
have in mind yet.

Notes

[1]This paper is based in part on an address given to the Westchester Council of English Department Chairs, May 13, 1983, Valhalla, New York.

[2]Page, E. "The Imminence of Grading Essays by Computer," Phi Delta Kappa, 47, No. 4 (1966), p. 239.

[3]Little, Timothy. "A Grading Technique Using SCRIPSIT," TRS-80 Microcomputer News, 1983, 5, No. 5 (1983), pp. 13-14.

[4]Menahan, Brian. "Computing and Revising," English Journal, 7, No. 7 (1982), pp. 93-94.

[5]Gould, J. D. "Composing Letters with Computer Based Text Editors," Human Factors, 23, No. 5 (1981), p. 597.

[6]Daiute, Colette A. "Word Processing," Electronic Learning, March/April 1982, pp. 29-31.

[7]Dudley, A. "The Mountain View - Los Altos Union High School District," Electronic Learning, February, p. 28.

[8]Wilson, Kara Gae. "English Teachers: Keys to Computer Literacy," English Journal, 70, No. 5 (1981), p. 53.

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COMPUTER TECH AND THE WRITING TEACHER

Sandra J. Balkema, University of Michigan

Computer technology has infiltrated the writing classroom.
Many English educators are panicking, and maybe those who
aren't should be. These aren't the old CAI programs of the
sixties that we could ignore, pass off as a fad, and criticize
for their bad pedagogy; rather, this new technology is in the
form of word processing, interactive programs, and language
generating systems. Our students are different, too. They are
being introduced to computers at an early age: they play video
games on them, do their math homework on them, and learn how
to program them. Computer technology has become a part of every
aspect of their lives--why should the English/writing classroom
be any different?

While some school systems are offering extensive training
programs for their teachers when they acquire the new machinery,
many more do not. Or they expect their teachers to educate
themselves. For many teachers, the temptation to run into a
computer store and grab the available software is just too
strong, and they end up hating the computer intruder for its
mechanistic approach to education. These teachers have turned
computers into drill sergeants.

Computer technology can, however, offer writing instructors
a vehicle or tool for writing that they and their students can,
and must, learn to manipulate. If you're one of those who is
seeking to educate him/herself in the ways of computers, I offer
here a plan for this self-education, a plan which, though
largely based in common sense, may also provide an introduction
to other, less-obvious, resources.

The first step in educating yourself about the educational
applicatiuns of computer technology is to understand the

language of computing. Knowing the language, the jargon if you
must, is essential to this fast-growing field. At the least
you will need to be able to differentiate between the terms
hardware, software, and firmware and the differences between a
mainframe computer, a mini-computer, and a micro-computer.
(Classroom Computer News offered the rather cute definitions
for the "wares": "If you can see it, touch it, smell it or lift
it, it's 'hardware.' If you can type it on a keyboard or load
it into a cassette or disk drive, it's 'software.'"[1] Firmware
refers to the combination of hardware and software in one
institution's, or person's, use.) One of the easiest ways to
start is to do some general introductory reading. I suggest
three stages to your reading: (1) begin with general books
written for the layman--intended to be introductory and not
technical, (2) familiarize yourself with research in related
fields, and finally, (3) add the reports from the composition
field.

    Because of the speed in which computer technology is
advancing, most books written about computer technology are
outdated before they are published. A few books remain, however,
which offer such valuable insights that their technical age is
not a deterrent. An excellent example is Christopher Evans's
Micro Millenium.[2] Evans's entertaining style makes the history
of computers fascinating and the description of the logical
system of computers a breeze to understand. By reading a book
like MM, you will be learning the technical terminology almost
painlessly while at the same time gaining invaluable contextual
knowledge about the emergence and development of computer
technology. Evans also touches on important social issues
raised by the advances in computer tech as well, including
computer crime, artificial intelligence, and the possible
threats to privacy. His chapter on the death of the printed
word, too, is especially rich in implications for our profes-
sion. Evans's strength is that he is not overly technical, nor
jargonistic, and because of this, MM offers a concise, yet
accurate introduction to the field of computers. Evans ends
with predictions of the effects of computer technology. These
are based on obviously outdated material and, thus, are not the
most interesting or useful parts of his book. They read a bit
like a Jules Verne novel: the predictions are general enough
to be believable, but too general to offer any insights.

    I suggest following Evans's book with Seymour Papert's
Mindstorms: Children, Computers nd Powerful Ideas.[3] While
Evans provides an introduction to the technical vocabulary and
to the mechanical workings of computers, Papert is an exciting
introduction to the world of educational computing. Although
clearly outdated in terms of his discussion of available

software and even hardware, Papert's book is important for its
vision of computers in education. In all of his work, Papert's
vision is clearly one of the computer as a tool, a facilitator
of learning. Papert studied with Piaget and is best known for
LOGO, the computer language he (and his colleagues at M.I.T.)
developed. LOGO was designed to allow youngsters to program
the computers and, thus, to give them control of their learning.
Papert is also the developer of Turtle geometry, a software
system designed for math education. Many of his examples in
this book are also for math education, but his excitement and
philosophy is generalizable to all fields. Papert was also one
of the first educators to recognize the possible implications
of word processing on the teaching of writing and discusses
this briefly in Mindstorms. The attraction of this book is
partly its "age"--reading Papert gives you the feeling of being
in on the field at its beginning.

        After these two, the list of useful books falls off
abruptly. If you are interested by the kind of social pre-
dictions made by Evans in the last chapters of MM, Alvin
Toffler's Third Wave and Future Shock[4] provide titilating
reading, offering a broader picture of our future. with com-
puters only a part of the focus. The number of other more
technical or "how to" sources of information on computer
technology increases daily: while many may be limitedly
useful, remember that most will not be accurate pictures of
the market by the time they are printed.

        Instead, journal/magazine browsing will provide current
information on computer trends and applications. At the risk
of sounding a bit contentious, let me offer this advice: as
you begin the second phase of your reading, avoid reading
research reports in the field of composition until after your
basic education is complete. Instead, begin with general
educational computing journals and the semi-technical computer
magazines. By obtaining an understanding of computers in
general and of research in other fields, you will be giving
yourself a context in which to base your understanding of the
current composition research and a better sense of the most
worthwhile directions for future composition research.

        For those interested in the technical aspects of com-
puters, Byte, Personal Computing, and Creative Computing are
excellent sources. At first, they will be much too technical
for most educators' uses but should not be forgotten for your
advanced reading. They are excellent sources of information
about technical innovations and future developments which will
not be visible in the educational journals until much later.
Of the educational journals available, I'll suggest here only
three of the better ones which offer articles and advertisements

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specifically for educators. Yes, advertisements: you can
learn more about the direction of change and innovation by
reading the ads in the technical journals than by reading ten
times the number of articles. (1) T.H.E., Technical Horizons
in Education, offers excellent discussions on the uses and
abuses of technological innovations in education; (2) Pipeline
is a journal published twice a year by CONDUIT, a nonprofit
organization whose purpose is to promote the use of in-
structional computing at the collegiate level; and (3) Classroom
Computer News (CCN) is another excellent publication, usually
directed at primary and secondary levels. Reading in these
three magazines will give you a solid understanding of the
current activities in educational uses of computers.

    T.H.E.[5] is published eight times a year by Information
Synergy, Inc. It offers articles by leading educators on
various aspects of educational technology, including the social
implications of computer tech, the impact of telecommunications,
the use of computers in a Montessori classroom, the selection
of CAI programs, and the uses of videotaped lectures. A recent
issue presented an excellent article on the use of micro-
computers in school reading and writing workshops.[6]

    Pipeline similarly provides feature articles examining, in
particular, computer applications at the collegiate level. It
also provides catalogs of CONDUIT programs, and reviews of
educational software. The Spring 1983 issue of Pipeline was
devoted entirely to computer applications for the English
classroom and includes articles on the use of computers for
developmental writing, the computer and the process of
composition, and computers as "poets."

    CCN is published quarterly by Intentional Educations. CCN
and another journal, The Computing Teacher, are primarily aimed
at elementary and secondary teachers. CCN's technical level
is quite low; it is extremely easy for those with an intro-
ductory knowledge of computers to read and understand. The
articles range from suggestions for inservice training to a
section of classroom activities that promote computer awareness
for middle-school students.

    Although these journals are written for a general audience
of educators, articles which deal specifically with English
education are frequently found in these publications. Each
provides a different kind of service and is written for a
slightly different audience: your choice of preferred journal
will most likely be a factor of your interests and teaching
level.

The final stage of your reading education can now lead
into the research reports. There are four areas or fields
currently interested in computers and writing research whicl.
provide important insights for your own classroom use or
research: (1) cognitive psychology, (2) human factors
engineering, (3) composition--composing process, and (4) com-
position--mechanical and structural materials.

In order to understand the context of current composition
research (and thus the issues we as writing teachers must face),
I again suggest that you begin by ignoring composition research
and read in the other two areas first. Understanding the
questions that the other fields are asking can help us, I think,
ask more appropriate and worthwhile questions of ourselves.

The first area, cognitive psychology, has contributed a
great deal to our understanding of the composing process of
paper and pencil writers and can contribute immensely to our
understanding of "computer literate"[7] writers. Much of the
research which interests composition theorists is that which
studies human problem-solving. Using computers as facilitators
of the process of problem-solving or as vehicles for teaching
problem-solving skills (i.e., analysis, categorization, and
differentiation) is fast becoming an area of interest for
educators who wish to study the transference of these skills
to all disciplines. Yvonne Waern, a psychologist from the
University of Stockholm, Sweden, has studied the thought pro-
cesses of students as they read.[8] D. H. Watt has compared the
problem-solving styles of two students learning LOGO.[9] Linda
Flowers and John Hayes' work in the cognitive processes of
composing is built on some of this research in cognitive
psychology and offers especially important resources for
researchers interested in computer composing.[10]

The second area, human factors research, is an offshoot of
industrial engineering and is concerned primarily with the
interaction of humans and machines. Research of interest in
this field focuses on such issues as the effects of the keyboard
or video display on the users of the machines, on the office or
classroom environment on the worker/student, or on a user's
ease in using a specific text-edit software package. Much of
this research does emphasize the interaction between man and
machine and on the mechanical or physical properties of the
machine or environment which help or hinder the user. However,
the questions many of these researchers are asking are directly
related to the user as a WRITER as she faces a particular
writing task and can be e remely useful for writing instructors.
Some useful work has been done, for example, in evaluating and

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comparing text-edit software for its learning ease, its
capacity to manipulate text, and its relative ease of use.[11]

Some excellent reports of this type can also be found in
journals like Human Factors and Ergonomics. An article by
Embly and Nagy on the "Behavioral Aspects of Text Editors"[12]
is one of the better articles on this topic. Most of the human
factors research is being done by the major computer companies
as they attempt to make "friendlier" software than their
competition. Xerox, Bell Labs, and IBM, for example, sponsor
major research efforts and support their own extensive research
labs. Xerox's Palo Alto Research Division sponsored the com-
parison and evaluation of text editors mentioned above, and
Bell Labs, the work of R. B. Allen in identifying the
"Cognitive Factors in Human Interaction with Computers."[13]
IBM's John Gould has done extensive human factors research into
the area of business uses of text editors.[14]

A few composition researchers are following the work of
these two fields, and isolated patches of research are springing
up. Lillian Bridwell, Paula Nancarrow, and Donald Ross at the
University of Minnesota,[15] Valarie Arms of Drexel University,[16]
and many others are investigating the uses of computers in the
teaching of writing. It is not unusual to find most of this
work being done, however, in engineering schools or in
technical/business writing departments. In a provocative paper
by John Brockmann and Rebecca McCauley of the Engineering and
Speech and Hearing Sciences Departments (respectively) at
Arizona State University, the authors discuss the future of
computer "writing" and show that real change in writers' com-
posing processes will occur only when communication is entirely
composed and transmitted on computers--without any paper or
"hard" copies.[17]

Recent issues of College Composition ar.d Communication and
College English have featured reports from composition re-
searchers interested in the impact of computer text editors on
writers and the writing process. The May 1983 issue of CCC
featured three articles on the use of word processors by
writers. Two of the articles reported on projects which
studied "novice" users of word processors as they worked through
a writing project. CE articles have included one discussing
software applications for the English classroom, and another
examining the role of the "computer specialist" in an English
department.[18] Although interest in research based in the
concerns of the English classroom is increasing, more work
clearly needs to be done in the composition field which takes
into account the important advances made by researchers in
these other fields.

The fourth area of reading takes you into the educational
software, sometimes referred to as CAI (computer-assisted
instruction). CAI is a term avoided by many educators because
of its association with the less-than-successful CAI attempts
of the 1960s. All of these terms generally refer to com-
puterized instructional material. I've already mentioned two
excellent sources of information about this material: CONDUIT,
which provides catalogs in Pipeline, and CCN, which regularly
evaluates new software. MECC (the Minnesota Educational
Computing Consortium) is an additional source: their newsletter
carries summaries and reviews of popular market software.[19]
For now I'll simply note these sources of information. I make
my hesitations about this area clearer later in this article
and explain what I consider its limitations and pitfalls for
educators.

But reading isn't all you should be doing. After you've
read the first few articles and books, you need to get some
actual hands-on experience to make this education applicable
and, obviously, clearer. Rather than confuse you with too much
technical information in this article, I'll suggest again a
strategy for learning about the machinery itself. Because the
logic, or, shall we say, "structure," of computing itself does
not change from system to system, from micros to mainframes,
you need to understand only a couple of concepts to follow
this advice. First, computers store information in units called
"files." These files, in most systems, are your own personal
files, which you create, you fill with the information you want
in them, and you manipulate any way you want. A good visual
representation of the storage system is to consider the computer
as a file cabinet (if it's a large system, perhaps a room full
of file cabinets). The file cabinet, or drawer, with your name
on it is full of file folders. These file folders are the same
as computer files. Each is labeled with a name you know the
significance of; whether you name it "trash" or "art" or "let.
mom," you'll know if it contains scratch work, an article, or a
letter to your mother. Most file names are mnemonic, just as
file folder labels are. Like file folders, most computer files
have a size limitation: you can't put too much in them or
they'll overflow. But you can take the material out, look at
it, change it, reproduce it, mutilate it, or destroy it com-
pletely, just as you can with the material in your file folder.
You can run programs on the files: if the file contains all
numerical data, you can add it, subtract it, match it with data
in other files, etc. You have the idea by now. One thing nice
about computers is that reproducing a file (creating a
"backup" version) is easy to do--and also important to do. The
duplicate is often kept in a different file cabinet (on a
separate disk or tape) so that if anything were to happen to
your original, you have an extra copy.

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Once you recognize the similarities between systems, you will be able to determine which of the differences are important to you. For now, however, for your introduction to the workings of a computer, all you want to know is the basics. The rest will come later. My advice for your initial experiences is to avoid both educational and games software. Both uses of computers are narrow, and lead to a mental trap: neither use allows the user to see the full capabilities or to envision personal uses beyond the drill sergeant and the machine gun. Begin by learning as many uses as you can. The more of the versatility you recognize, the more you'll be able to create your own applications of those uses.

So where should you begin? One of the less painful ways of gaining hands-on experience is to ask a friend who owns a personal computer (another name for a microcomputer) to let you play around with it. Or go to a computer store, admit your innocence, and ask for an introductory demonstration. Don't worry initially about the comparable worth of various systems--don't even try to compare. Your goal should be to feel comfortable with computers, not to buy the system you're using or the salesperson might be selling.

Ask your friend/salesperson to show you how to get the system to do simple arithmetic. Try balancing your checkbook--or creating a file that keeps track of your budget. Then ask him/her about its word processing capabilities (both of these functions are common software applications available in various forms for most microcomputers). Open a file and compose a letter to your mother. Learn how to back up a space, a line, a page. Make revisions in what you wrote. Learn how to move your salutation to the middle of your letter, to the end, then back to the beginning again. Learn how to change every occurrence of the word "the" to "ugh" and back again. Learn how to tell the machine to print the letter according to your specifications (double space it, or print it in one long column).

After you've had four or five hours of fun (and probably some frustration, too), you'll have some sense of what it can do, and probably a lot of questions about its ability to do what you'd like it to do. When you started this computer education program, you may have had an idea of what you'd like to use computers for; now you should be ready to take these old ideas, or your new ideas, and learn how to convert them into realities.

The size and kind of computer you'll buy or use will depend on its intended uses and, of course, the resources available to you at your school. Microcomputers--or personal computers, as the market refers to them--are most likely the

form that you'll be dealing with. The distinction between
microcomputers, minicomputers, and mainframes will, at this
stage. be more confusing than useful, so for our purposes think
of a micro as a system that is used primarily as a personal
computing instrument and the other two as institutional systems.
No matter what the size or type of microcomputer, there are four
main physic' components of most "complete" systems: (1) a
keyboard which closely resembles a typewriter keyboard, (2) a
CRT (cathode ray tube) or video display of some sort, (3) mass
storage or memory, and (4) a printer for finished or "hard"
copies. This is considered an extra for many computer people,
but for writing instructors, a must. As I mentioned above, an
exciting and likely future development will be the disappearance
of paper copies entirely. For the near future, however,
printers are a firmly established "extra." When you are ready
to buy, many of the more technical journals I listed earlier
will provide information and helpful comparisons of the systems
and software available. Before you buy any software, make a
careful comparison between systems and get plenty of advice.
And especially before you buy any instructional software,
examine it closely and determine its aims and the educational
philosophy behind it. Be careful that you don't get carried
away with the excitement of having a new toy and accept
unquestioningly all the gadgets or educational "games" you
can find.

I would like to conclude with a comment or two about the
implications of all of this. I am convinced that our role as
writing teachers in the computer revolution is going to be an
important one. And I'll argue that we need to take our role
seriously. As English teachers, we have been the keepers of
"literacy" for many many years, a role that isn't likely to
change in the near future without a radical alteration of our
entire educational system. Therefore, we'd better consider
the implications of computer technology on these literacy
skills.

Right now I think the biggest disservice we could do our
students would be to turn computers into teaching machines: to
buy micros for our English classrooms and writing centers and
buy a bunch of programs to teach spelling, sentence recognition,
or whatever. This is why I hesitate to encourage use of such
software: drill exercises are rarely appropriate or effective
pedagogy. Attached to a computer they may hold our students'
interest for a while longer, but their worth isn't likely to
increase.

Instead, I think we ought to be educating our students in
the same way I'm advocating that we educate ourselves: with
an understanding of the many uses--and abuses--of computer

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technology. And in our roles as writing teachers, what better starting point than to educate them in the uses of computers as writing tools. In the workshop, micros should be available for student use--from planning their work, "brain-storming" or doing pre-writing preparation, to composing and revising, to formatting it and preparing paper copies.

The effect of word processing systems on the composing process is still a very little-understood area. Right now we don't know if computers will simply replace the typewriter as a newer and easier paper copy preparer--or if there will be major changes--in the way we think about pre-writing (the computer is a library, a resource of information and a link to information not physically present; it can be an interrogator as in the better CAI programs; or it can help to organize our material); about writing, (the physical act of writing will now be complicated by the "writer's" typing skill--instead of by the aesthetic quality of hand gripping pen while forming letters and words); and about revising (isn't all writing revising?--and the ability of word processors to manipulate text make them clearly the greatest facilitator of revision that has ever existed!). Researchers from various fields are interested in the effects, though, and important work is being done. From cognitive psychologists to human factors engineers to rhetoric and composition theorists, the questions surrounding man's use of computers to communicate are being asked. But we can't wait for the research to be completed before we act. If we begin by helping our students recognize the power of computers as writing tools, to be sensitive to their own roles as communicators and processors of words with this tool, we can only be helping them and ourselves toward a better view of computer technology in our society and of this technology as one that can work for us to improve our communication with each other.

Notes

[1] *Classroom Computer News*, Vol. 1, No. 6, July-Aug. 1981.

[2] Christopher Evans, *The Micro Millenium*. New York: Viking Press, 1979.

[3] Seymour Papert, *Mindstorms: Children, Computers, and Powerful Ideas*. New York: Basic Books, 1980.

[4] Alvin Toffler, *Third Wave* and *Future Shock*, New York: Random House, 1970. Both also in Bantam Editions.

[5] *T.H.E.* has a limited number of free one-year subscriptions available to educators. For information about a free subscription, contact *T.H.E.* Subscription Department, P.O. Box 992, Acton, MA 01720.

[6] Robert Levin and Claire Doyle, "The Microcomputer in the Writing/Reading/Study Lab." *T.H.E.*, Vol. 10, No. 4, February, 1983.

[7] The term computer literate is both ill-used and ill-defined. In most cases it refers to an understanding of computer technology and an ability to use and/or program computers. The level of knowledge needed to claim the skill of computer literacy, however, is debatable. In all uses the term carries a double sense of "knowledge" of computers, though: both a mechanical/technical knowledge and an understanding of the social implications of computer technology.

[8] Yvonne Waern, "Thought Processes During Reading," Working Papers from the Cognitive Psychology Seminar, No. 2, June 1978.

[9] D. H. Watt, "A Comparison of the Problem-Solving Styles of Two Students Learning LOGO," *Creative Computing*, December 1979.

[10] See for example, Linda Flower and John R. Hayes, "The Cognition of Discovery: Defining a Rhetorical Problem;" "Problem-Solving Strategies and the Writing Process," *College English* 39 (December 1977) 449-461; and "Identifying the Organization of Writing Processes."

[11] Teresa Roberts, Evaluation of Computer Text Editors, Xerox Palo Alto Research Report, 1980. (Doctoral dissertation, Stanford University, 1979.)

[12] David W. Embly and George Nagy, "Behavioral Aspects of Text Editors." Computing Surveys, Vol. 13, No. 1, March 1981.

[13] R. B. Allen, "Cognitive Factors in Human Interaction with Computers," Bell Laboratories Research Report, 1982.

[14] See J. D. Gould, and S. J. Boies, "How Authors Think About Their Writing, Dictating and Speaking," Human Factors, 20, No. 4, 1978; and J. D. Gould, "Comparing Letters with Computer-based Text Editors," IBM Research Report, 1980.

[15] Bridwell, Nancarrow, and Ross also provide a bibliography of current research in composition and computer technology, available by writing them at the University of Minnesota.

[16] Valarie Arms, "The Computer and the Process of Composition," Pipeline, Vol. 8, No. 1, Spring 1983.

[17] R. John Brockmann and Rebecca J. McCauley, "The Computer and the Writer's Craft: Implications for Teachers," (Paper presented at the CCCC, Detroit, MI, March 1983).

[18] CCC, Vol. XXXIV, No. 2, May 1983. Articles include: "The Computer as Stylus and Audience," by Colette Daiute; "Computerized Word-Processing as an Aid to Revision," by John C. Bean; and "The Word Processor and Revision Strategies," by Richard M. Collier. College English articles include: "Monsters and Mentors: Computer Applications for Humanistic Education," by Helen J. Schwartz, Vol. 44, No. 2, February 1982; and Joseph H. Bourque, "Understanding and Evaluating: The Humanist as Computer Specialist," Vol. 45, No. 1, January 1983.

[19] MECC Users Newsletter, 2520 Broadway Drive, St. Paul, MN 55113.

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CONSIDERING THE FULL RANGE
OF COMPUTER APPLICATIONS
IN THE COMPOSITION CLASSROOM

Jim Karpen, Bowling Green State University

For the past ten years computers have been used in compo-
sition instruction mainly for drill; for example, the computer
flashes a sentence on the screen and asks the student to
identify the error. If the student answers correctly, the
computer congratulates the student; if not, the computer informs
him or her and gives another opportunity. Indeed, software
reviewers continuously lament that much computer-assisted
instruction today is still little more than a fancy version of
flashcards or of a self-instruction text that uses programmed
instruction--a real waste of sophisticated technology.

More recently, computers have been programmed to analyze
texts, measuring such aspects as average sentence length and
syntactic complexity, and reporting the results of these measure-
ments to the student. Also available are useful software
packages such as spelling checkers, which check to see that
every word is spelled correctly, and programs which look for
cliches and vague or wordy expressions.

But even these applications--as valuable as they are--are
limited. In order to begin to discover the tremendous impact
this new technology can have on the teaching of writing and on
the writing process, it will be necessary to try to discover
and outline a range of possible applications so that educators
don't limit the potential of this new tool. The following list
is one such range of ways of looking at the computer when
considering how it can be used in the teaching of writing:

    1. computer as instrument
    2. computer as idea generator
    3. computer as drill master
    4. computer as editing tool

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5. computer as text analyzer/text corrector
6. computer as workshop device
7. computer as telecommunications tool
8. computer as topic
9. computer as new medium

The first consideration is simply the computer as instrument. Students today have grown up staring at TV screens and playing video games, and some will be motivated to write just because of the opportunity to use a computer. More important, though, is the fact that some students find this a more comfortable instrument than pen and paper or typewriter. In his Popular Computing article "Word Processors and Writing," Daniel Watt tell the story of Tina, a sixth-grade student who had been having problems in English class. Once she had access to a computer, she blossomed as a writer, Watt claiming that "the computer played an essential role by providing a tool to make writing easier." He explains that Tina was compulsive about two things: she hated to make errors and she loved neatness. Using a computer text editor allowed her to correct her errors before printing out a final version. "She no longer had to tear up, throw away, and dismiss her work when she found an error." She was also delighted to be able to have "as many beautifully printed copies as she wanted. The more copies she gave away, the greater her chances for positive feedback from those who read her stories." Thus, the computer was not only a preferable instrument, it also motivated Tina because it was capable of "outputting" an attractive product and making many copies. Watt also points out that the computer can also be an advantage to children with physical and neurological handicaps, some of whom are not able to handle pencil and paper.[1]

In addition, the computer can help generate ideas. An interesting program called Topoi, with a number of versions floating around at various universities, helps students with content by helping them to clarify their purpose, to organize their ideas, and to be aware of their audience. It asks a series of leading questions and provides rearrangement and juxtaposition of ideas. Typically it uses a kind of Rogerian interaction, first asking the student his or her name and then continuing with a series of questions; such a conversation might proceed as follows:

"Hello. Please type in your name."

"J-i-m."

"What do you want to write about today?"

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"b-a-s-e-b-a-l-l."

"That's an interesting topic, Jim. What about baseball
interests you?"

Another important use of computers is drill, and despite
the disparagement from many quarters, this can be a valuable
activity, especially since computers can store a wealth of
exercises and can use convenient menus (similar to a table of
contents) to organize them. Some fairly good software packages
are just now coming onto the market, among them a large number
of grammar drills from COMPress, a division of Van Nostrand
Reinhold Company. These exercises are broken down into ten-
minute lengths and use varying formats to hold interest. The
drills include exercises that deal with fragments, splices,
agreement, and appositives. COMPress also has a program, which
is the first in a series of four that will eventually be
available, to help with wordiness. Wordy sentences appear on
the screen and the student types in the unnecessary words. If
he is correct, the computer tells him; if not, he gets another
opportunity, always having the option to go back to the
explanatory material. Among the nine topics covered are
circumlocutions, redundancy, and vague expressions. Other
programs in this series will deal with such things as forms of
obscurity and logical fallacies.

Perhaps the most important consideration in regard to the
effect of the computer on the writing process is its value as
an editing tool. As Daniel Watt notes, "All of us have
difficulty evaluating and revising our work;" even simple
corrections become a horrendous experience, either because of
the need to use gooey fluids and flaky papers or because of the
necessity of retyping. However, with the use of a computer one
can correct errors and print the text without retyping the
entire piece. Indeed, one can also constantly rearrange the
text, trying different sequences of ideas, comparing versions,
experimenting with different phrasing. In the computer the
text becomes much more malleable. Watt believes that the most
serious barrier to learning to write well is the grueling
process of revising, integrating all the changes, and then
rewriting the entire piece. Hence many students stop after they
have written a first draft. But word processing makes the
process easy, and if students have the opportunity to use word
processors, they will find it easier--perhaps even fun--to
revise and rewrite. For those teachers who focus on rewriting,
the computer will be an extremely powerful tool. The students
could write many versions of the same paper; each version might
be oriented toward a different audience or might use a different
stylistic technique, such as embedded modifiers or left- and
right-branching sentences.

As mentioned earlier, much software is already available
that helps the individual find such errors as cliches and mis-
spelled words. This use of the computer as a text analyzer and
text corrector will be another valuable application in the
classroom. Discover magazine reported a program developed by
Bell Laboratories, called Writer's Workbench, which scrutinizes
the prose style of a piece of writing. According to the
article, it

> spots cliches and wordy phrases, slashes long, rambling
> sentences, suggests lively alternatives to deadly jargon,
> and pleads for simplification of the overly complex. On
> the mechanical side, the Workbench corrects spelling,
> punctuation and grammar. And if the writer demands a
> literary appraisal of his work, the Workbench will spin
> through samples of the works of famous authors to provide
> embarrassing comparisons.

The developers of the Workbench used major language guides such
as Strunk and White's Elements of Style and Theordore Bernstein's
The Careful Writer. Its original purpose was to help scientists
write better prose, and the article says, "The results indicate
that the Workbench improves the writing styles of most of the
people who use it," including a group of students from Drew
University who used it to analyze their Shakespeare papers. The
program will perform such functions as locating passive con-
structions and advising the writer to change them. It even
assigns a readability level to an individual's prose based on
such factors as average sentence length and the percentage of
compound-complex sentences, the standard being determined by
the documents stored in the Workbench's memory.[2]

In fact, this "program" is a set of thirty-two integrated
programs, necessitating sophisticated equipment far beyond that
available to most classrooms. But this program was developed
several years ago, and, generally, major developments such as
this spin off simpler versions which are useful and practical
and which are more widely available. Also, small computer
systems are rapidly becoming so powerful that many of them can
now begin to handle software that was originally developed for
large mainframe computers. And many schools have independently
developed software using similar principles, some of these
programs having been in use for many years. At a recent
conference a college instructor from a university in Texas told
me that since 1972 they have been using a computer program
which helps students with the revision process.

Another important consideration is the computer's ability
to communicate with other computers. One recent development
called "reflexive processing" allows a number of computers to be
linked together so that what appears on one screen appears on
all the other screens simultaneously. If a teacher is

accustomed to using a workshop approach in the composition
classroom, think of how effective it would be for the students
participating to all have the same text displayed on their
screen. Then if a student has an idea for a particular altera-
tion of the text to improve it, he can simply type in the
changes, the other students watching the text on their screen
being altered and perhaps each taking their turn at making
changes in the text.

A related area is the use of computers for telecommunica-
tions. Most communities have "electronic bulletin boards,"
which are simply networks of computers that allow individuals
to leave each other messages, information, letters, and other
documents. This could be a great motivator for students who
would enjoy connecting to local--or national--networks and
leaving messages and essays on these electronic bulletin boards.
They might be spurred to write well if they know that someone
in Pocatello, Idaho, is going to be reading and responding to
their writing. A recent book titled Network Nation tells about
how people all around the country are connecting to each other
via their computers. Much electronic communication is taking
place, and students may be motivated to write if they know that
they will have a real audience and a practical and immediate
goal.

Another consideration in regard to computers and the
composition classroom is the use of the computer as a topic.
This will motivate those students who enjoy writing about this
new technology that is having a major impact on their lives.
The students could write about their experience using the com-
puter, which if it is new to them, would be a novel experience
that would lend itself to expression. Or they could write
about their experience playing video games and speculate on the
cultural import of this. They might also be given an oppor-
tunity to analyze how computers are influencing their lives and
to make some value judgments. The main point is that the use
of computers can be an integrated experience in the classroom:
not just one more instrument for writing, but an instrument that
must be scrutinized--with this scrutiny being expressed in
writing--so that the students can begin to understand the complex
relationship that exists between them and technology.

In addition to all these considerations is the important
consideration of the computer as a new medium. In the very near
future the computer may be taking over many of the functions now
served by writing. For example, we may tell students majoring
in business that learning to write well is important so that
they can write good business reports; however, we should con-
sider that in the future they may be writing very few business
reports. Many businesses today are beginning to do everything

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on computers, and business reports in such environments are less often conveyed through discursive prose than they are through a set of diagrams and charts generated by manipulating the data in computers. We shouldn't think that we need to be responsible for teaching students how to do computer graphics, but we should be aware that if we are going to computerize the composition classroom, we should on occasion allow the students to use the computers to communicate their information in ways other than discursive writing. Given the power and flexibility of these new tools, it isn't likely that in the future they will continue to be used primarily as a convenient replacement for pen and paper.

Indeed, in the very near future we will probably find it necessary to "reconceptualize" this business of teaching English composition. Since technology is radically transforming the nature of communication in regard to medium, process, and product, it might be more useful for us to think of ourselves as being in the business of training students to use technology for the purpose of ordering, expressing, and transmitting ideas and information. This is essentially what we have always been doing, except until recently the technology involved was pen and paper, and the means was writing. But now that computers are changing the way things are being done, we might find this reconceptualized definition of our purpose to be more useful. Students in college today will be spending three-quarters of their working lives in the twenty-first century, and if we don't begin taking into account this new technology, the computer science departments will end up teaching the students the techniques they need for communicating in the future. And given the ineptness of many computer programs in regard to clarity and "user-friendliness," we probably don't want to turn over our responsibilities to the technicians; rather, we should work in conjunction with them in the coming years as we teach students how to communicate well. We should never give up writing nor diminish its importance, but given the trends in regard to the pervasiveness of computers, we must perhaps begin to rethink our purpose.

Notes

[1] Daniel Watt, "Word Processors and Writing," Popular Computing, June 1982, pp. 124-26.

[2] Natalie Angier, "Bell's Letters," Discover, July 1981, pp. 78-79.

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WORD PROCESSING: A TOOL FOR WRITING

Margaret L. Mittricker
Westwood (New Jersey) Regional Schools

These days, teachers are being inundated with information
concerning the role of computers in the schools of the future:
journal articles argue the pros and cons of various uses of the
computer, advertisements proclaim the virtues of hardware and
software packages, and conferences devote more and more sessions
to computers and education. English teachers hear much of the
value computers hold for them in terms of computer assisted
instruction and word processing, and software in both areas is
indeed improving. Yet, while the familiar format of most
computer-assisted instruction programs allows English teachers
to feel comfortable in judging their value and use in the
classroom, the unfamiliarity of word-processing programs and
the dearth of reports of actual utilization in the classroom
leave teachers a bit unsure of the value these programs hold
for them.

I hope to begin to dispel some of the mystery of word
processing through describing the experiences of two high-school
level creative-writing classes with a short unit in which they
used a word processing program to complete a writing assignment.
Having become an advocate over the last few years of the
importance of teaching writing as process rather than simply as
product, and having seen the positive role the use of a word
processor has played in my own writing, I decided to examine
the reactions of my students to using word processing in a
writing class.

Although the number of computers in schools is rapidly
growing, few English Departments as yet have access to computers
on a regular basis. Most computers are placed in mathematics,
business, and computer literacy classes or are used for
administrative purposes. I have found, however, that those with

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access to the school's computers are eager to spread the word
the computers' advantages and welcome the opportunity to
introduce others to their use. Thus, through the cooperation of
several departments in our high school, I was able to assemble
two Apple computers for my first semester class of nineteen
students and three for the second semester class of thirteen
students.

For several days prior to our actual work with the machines,
my students and I discussed the nature of computers and of word
processing and learned some of the basic commands of Apple
Computer Inc.'s Apple Writer program (first semester) and
Scholastic's Bank Street Writer program (second semester). All
handouts, of course, had been written with a word processor and
the printouts duplicated for the class. Armed with a basic
familiarity with the use of a word processor, the students then
moved on to their work with the computers.

Because of the differing numbers of computers and machines,
a different management procedure was followed for each class.
Both classes were divided into groups for the project. The
first semester's nineteen students were divided into four groups,
each of which had access to a computer for a half period a day
for a week. As two groups did their work at the computer, the
other two did the same work on paper. Halfway through the
period, the groups switched. After each day's work, I added
onto each group's file the work which they had done on paper.
In this way, although not the ideal situation, students were
able to continue with their work with some efficiency when not
working on the computer. During the second semester, numbers
made it possible to divide the thirteen students into three
groups and allow each group to work with the computer for a
full class period for six days.

The group writing assignment involved an opinion article,
but the content was not as important as the process. The first
day with the machines was a day to become acquainted with the
business of using a word processor. The students practiced with
the more common commands of use in edition and revision, and
particular students in each group took the role of expert
consultant for particular commands. For those students using
Bank Street Writer, a computerized tutorial was available to
introduce the various commands. I served as tutor for those
students using Apple Writer. Both classes were given written
summary sheets of the commands for use during the remaining
sessions.

The students made their first use of the word processor as
they worked on a pre-writing activity: brainstorming ideas for

topics. They had little difficulty in building a varied bank of
ideas and then made use of the word processor's capacity to de-
lete material from the screen in order to eliminate unwanted
topics until one remained.

The students' next step was to generate details to use in
writing about their topic. Since the assignment was an opinion
paper, details for arguments both pro and con were included.
Some groups had chosen their stand on their issue before
generating details; others made the decision during the details-
generating process. Once a group was satisfied with its details,
use was made of two word-processing capabilities to order the
details before writing. The ability to delete material from the
screen was used to eliminate details which were deemed unneces-
sary. The ability of the word processor to move words and
sentences to different positions on the screen was used to put
the remaining details in the most effective order.

The following days were spent writing a draft and working
with revision and editing. Students quickly came to see the
value of doing this work at the computer, and those in the
first-semester class who were sharing the machines among groups
loudly voiced their complaints if those working first at the
computers overran their time limit. I divided my time between
being consultant and observer, and I was quite excited by what
I saw occurring.

The quick changes and decisions often made during the
writing of the first draft appeared to be easy for the students
to do with the word processor. If a particularly desired word
or phrase eluded the students, they simply brainstormed several
possibilities in parentheses in the text; these were quickly
deleted later and replaced with the desired word. The groups
frequently tried out several ways of wording a particular point
and then deleted all except the one finally chosen. When ideas
arose which should have been included at an earlier point, it
was no problem to move back quickly in the text, add the extra
idea, and then return to the former point.

It was during the revision process that the students' use
of the word processor seemed especially valuable. How difficult
it is to get students to do more than surface editing when they
often see revision as simply copying over the paper neatly.
How we struggle to get students to add more details, to clarify
points, to delete unrelated parts, to rearrange sections of what
they have written. The word processor makes all of these
actions simple.

Once the first draft was finished and hard copies printed,
the students spent quite a bit of time examining their work and

offering suggestions for changes. Returning to the text on the
screen, they moved through their work, adding words, phrases,
sentences, or paragraphs. They experimented with changing the
order of some of their arguments and discussed the effect that
these changes had. They tried different ways of wording some
of their ideas and deleted those that did not seem to fit. If
any of the changes proved unsatisfactory to them, they quickly
restored the original version.

The temporary nature of their work on the computer screen
as compared to the more permanent feel of a handwritten copy
seemed to add to their willingness to experiment with revision.
Because their wor's on the screen could be rapidly manipulated,
t of st   seemed to see the process of revising as
less personal   c atening.

Editing, too, became an easier process. Students quickly
moved through their text on the screen, dictionary and grammar
book in hand, correcting errors in spelling, punctuation,
mechanics, and struc   Perfection in editing became a much
more reachable goal.

A final advantage of the word processor for both revision
and editing was frequently extolled by the students: once a
series of changes had been made, a simple push of a button
resulted in a clean copy click-clacking from the printer. The
drudgery of copying over a paper messy with revisions and
editing corrections was gone.

Through the use of the printer, publishing of the students'
writing also became easier. The printed version was a form of
publication in itself, and the potential of this polished-
looking document for wider publication, perhaps as a letter to
the editor of the local newspaper, was easily seen.

By the time the students had completed this unit, they had
a full record of their project on a computer diskette. At
various points in their work, usually at the end of each period
or of each revision session, the most recent version of their
work was saved to the diskette. At the same time, hard copies
for each member of the group were printed out for use that
night as the students examined them for possible changes. At
the end of the unit both the students and I were able to go back
and examine the processes they had used as they wrote their
opinion articles.

As I watched the students work with the word processor, I
found that they tended to write longer pieces than they had
formerly done in a group writing situation and that they tended
to revise more extensively and to be more demanding in their

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editing. It appeared that word processing was a valuable tool
for them, and they reinforced this conclusion through their
comments and suggestions that the unit be lengthened for future
classes.

While the advantages of word processing were many, there
were, however, several problems which must be confronted. For
most of the students the use of a word processor was new, and
learning to use the commands as an aid in their writing took a
bit of time. By the end of the unit, they seemed to feel
comfortable with the mechanics of the program itself and were
aware of what they could use it to do. At this point, however,
our work with the machines was finished, and the students'
eagerness for more went unsatisfied.

An additional problem was the varying degree of the
students' typing abilities. For those who were slow hunt-and-
peck typists, the frustration of locating a letter on the
keyboard at times interrupted the writing process. While others
in the group were quick to help, the need for a minimum typing
competency became evident. This difficulty is being recognized
increasingly by school districts as they begin to teach typing
skills at earlier grade levels.

The most crucial problem, however, was that of the number
and availability of computers. The presence of computers in
schools is relatively new, and their use for word processing
in English classes is even newer. Ideally, of course, each
student would have access to a computer for word processing for
more than one unit in a course. As districts develop their
computer program, and the nu   r of computers in schools grow,
English departments must make known the value computers have
for their students and work toward the inclusion of word
processing in the English class as a part of the school's
overall computer program.

None of the above problems are insurmountable, and with
time and careful planning, they can be eliminated. In all, this
experience with word processing as a tool for writing has left
both me and my students with a feeling of excitement for the
future of writing in the classroom. It became clear that word
processing is valuable for placing emphasis on the various
stages of the process of writing, and that this tool has a
definite role to play in the English teacher's future.

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In the meantime, we must insure ourselves a place in our
district's plans for computers in education. Experiments such
as that with my creative writing classes can do much to spread
the word that computers are not just for the math, computer
literacy, and business classes. It is time for us to learn
all that we can about the role of computers in the English class
and to take an intelligent part in planning for their use.

THE COMPUTERIZED TEXT AND ITS READERS

William Dennis Horn, Clarkson College

What effect will computers have on written communication?
Some critics point to voice synthesizers as evidence that the
computer boom will fuel a growing national illiteracy. They
argue that students will be able to talk and listen to computers
without having to read or write. Others claim that, as a
teaching aid, computers are already improving literacy for
younger students. They point out that in many schools the com-
puter is already teaching students spelling, reading, and the
intricacies of grammar. In fact, so the argument goes, we can
find in our local toy stores any number of micro-chip toys which
help Johnny and Janie learn to spell. Shall we make the easy
claim that the impact of computers will lie somewhere between
the poles of degenerative illiteracy and educational enhance-
ment? Reflection indicates that the impact of computers on
writing and the humanities might be even more subtle and more
fundamental than indicated in such a simple polarity.

In the following I shall attempt to suggest what form that
impact might take. In doing so it will be necessary to look at
the written word from a historical perspective (however
briefly), and to analyze the computer's influence on the writer,
the published text, and the reader.

A Brief Historical Perspective

By now it is clear that electronic data storage and pro-
cessing (use of the computer) ranks among the major milestones
in the history of man's ability to preserve and disseminate
information. Such milestones might in fact be ranked as

follows: (1) the occurrence of speech (with the concomitant
expansion of human brain size), (2) the invention of written
communication, (3) the invention of movable type, (4) the intro-
duction of radio-wave transmission of messages, and (5) the
development of the computer. Each of these events, while
revolutionary, has been somewhat less overwhelming than its
immediate predecessor. Each too, has brought with it inherent
disadvantages, and has changed the very nature of communication.

It is difficult to overrate advances in man's ability to
communicate. From an anthropological point of view, man's
successful adaptation results from his ability to communicate
culture. Advances in communication have facilitated his means
of adaptation. Nevertheless, each advance in communication has
had a recriprocal influence on the character of the culture.
Hence, in oral cultures a special status is given to the bard
who helps maintain the identity of his people. The ancient
Jews who came to keep a written history of their culture were
known as "the people of the book." In the Middle Ages special
privileges were awarded those who could read and write. As
late as the seventeenth century, Francis Bacon saved himself
from the chopping block by claiming benefit of clergy, an
antiquated privilege which had originated to preserve an
invaluable literate minority. Following the introduction of the
printing press, a reading puolic arose, in time, and with that
public, the newspaper and the novel.[1]

Thus changes in the means of communication bring about
cultural changes, as segments of society seize upon the new
technology to communicate a new class of things. In the
eighteenth century, for instance, a middle class, aspiring to
be upwardly mobile, was anxious to read Samuel Richardson's
novels of manners and morals. These epistolary novels began
as a sequence of models for proper letter writing. A similar
phenomenon can be observed today. The primary users of
computerized learning tools are socially ambitious middle class
youths, both male and female.[2] Whatever impact the computer
has on this gro ,'s approach to communication, it is bound to
have significant effects on our culture as a whole.

The Computer and the Writing Process

Whether his end product appears on paper or a display
screen, the writer has been given a new way to produce words
as visual images. Computer technology offers some rather
appealing gains over previous technology: (1) quicker access
to information, (2) ease in making changes to manuscripts,

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(3) faster production of printable copy, (4) the possibility
of computerized dictation, (5) programmed editing and immediate
feedback, (6) quicker and cheaper movement from typing to type-
setting, and (7) ease in producing endless variations on the
printed text. The gains are not without cost, in terms of both
money and the effect on the writer and his art. Hemingway
claimed that a line composed on a typewriter was difficult to
change because its appearance was so clean and definite. What
is the effect of words on a screen? Obviously, pencils and
paper are cheaper and more portable than Diablo printers. For
some kinds of writing the older system is superior. For
instance, how many writers are ready to dictate their manu-
scripts even if provided with a full-time stenographer? Many
writers use tape recorders, but only to compile their notes--
not for what they would call "writing."

When a writer, during the act of composition, makes his
changes on a word processor, there is no erasure or lined-out
word to which he can refer when searching for his original
intuition. Of course, at any point in his work the writer can
run a paper copy, before hazarding further changes in his
manuscript. Such ease in producing endless variations will
surely bring despair to the scholarly researcher attempting to
determine the "priority of manuscripts." Variorum editions
could become incredibly massive, and as we shall see in a
moment, the very notion of canonical works may require
readjustment.

The Computer and Publishing

Computers have already done much for the newspaper
industry. Journalists type their stories on personal computers
and send them via phone lines directly to a computerized type-
setter which formats them for the morning edition. More
significantly, the computerization of the press has allowed for
remote printing, enabling daily and weekly periodicals such as
Time and The Wall Street Journal to bring out regional editions.
Such various editions display regional advertising. Since the
type for two such simultaneous printings is reset significantly,
they are "editions" in the traditional sense of the term.
(Ordinarily, an edition is all of the copies printed from one
setting of the type.)

It is now possible to purchase computer-printed children's
books which incorporate into their story vital information on
your child. You simply send in your child's name, her favorite
color, her dog's name, and so forth. If each copy of such a

publication is significantly different, each could be called an
edition. Perhaps we might wish to take out a copyright on each
such edition. If so, we would need to send two copies of each
to the Library of Congress.

The future of such single copy editions (let's call them
ideographs) is not mere child's play, nor does it lie in the
computerized production of horoscopes. Already, computerized
news letters and newspapers are appearing on printers in the
home and office. With continued advances in high speed printing
and typesetting, the periodical ideograph lies in the immediate
future. Such a publication would contain advertisements
suggested by your personality profile and buying history. Even
the articles themselves could be selected through the use of
criteria specified by the subscriber. Books too in the form of
ideographs are likely to hit the adult market in a much larger
way. The first thing to look for is a computer sales catalogue
containing items compatible with your expressed interests and
buying record, and the hardware, peripherals, and software
you already own.

I say these things not to be in awe or consternation of
what the computer is bringing, but to show that our traditional
ideas of what constitutes a text are being modified simply
because of changes in the methodology of textual production.
To again put things in a historical perspective, there were no
"editions" of cave paintings and the commandments on stone.
Such productions are unique. When copies of sacred texts were
produced, the idea of exact and faithful renditions arose. The
invention of "barely" moveable type helped maintain the sacred
reproduction of an original. But now we have a means of
publishing which can cater to diversity rather than exact
reproduction. The computer provides us with a publishing
concept at a pole diametrically opposed to the ideal of the
exact photocopy.[3] If the Wall Street Journal were to be
published as an ideograph, varying for each subscriber, we would
be forced to throw out the notion of an original. There would
be only "copies" (each as individual as the proverbial snow-
flake) distributed throughout the world. If a subscriber chose
not to make a "hard copy," some of these "publications" would
exist only momentarily as flickers on the viewing screen, like
Bobby Burns's snowflakes "a moment white and gone forever."

Such temporal publications tend to make us uneasy at first.
However, this condition of textuality has always been with us,
if we are to believe the school of Post-Modern literary
criticism. All things exist in time; all paper comes to
destruction. Stones eventually crumble and the messages written
on them disappear. And what of the authoritative manuscript
from which all copies originated. There is no canon, no

original, no source, no "real" world of idea forms, no center,
no ten commandments written on stone, and no single "text"
behind our successive readings of a literary work. Perhaps the
new model of publishing does not lead us inexorably to view the
world in such "nihiliocentric" terms. But it can provide us
with a metaphor for understanding what Post-Modern criticism
means by describing the world in such a way. In its turn, the
critical deconstruction of the myth of textuality can help us
recognize what the new technology means to the world of letters.

The Computer and the Act of Reading

By now most of us are familiar with interactive programs
through which the computer offers us prompts and is in turn
guided by our response. This concept in programming can easily
be applied to the process of reading. A programmed interactive
text is one in which the computer evaluates the reader's
response to determine the next reading passage to be shown on
the screen. The technique, already widely used in tutorial and
"help" programs, has fundamental implications about the nature
of the reading experience. To see how this new technique
represents a historical departure, it is necessary to examine
for a moment the process of reading.

John Fowles' popular novel The French Lieutenant's Woman
offers two possible endings, one in which the lovers are united
and one in which they are not. The result for some readers is
disconcerting. This device, while not common, goes back at
least as far as the old fable of "The Lady and the Tiger."[4]
The usual response elicted by such stories is at first frustra-
tion, and later an appreciation of the writer's manipulation
of our response. However, suppose the reader were to read a
text on a computer terminal and supply his reactions to the text.
Then the computer program might supply one of two possible
endings according to the responses of the reader. Moreover, an
entire work might be written in which the story would be altered
according to the reader's response. The very plot of the story
might change on two different readings by one and the same
person who gave different responses on two different occasions.
The resulting product might not be so foreign to our experience
as it first sounds. The oral story teller has always in-
corporated changes in his story to conform to the reactions of
the audience. The play director has been known to cut scenes
because the king, in the audience, was falling asleep. The
ending of King Lear was altered for years to conform to the
sensibilities of a contemporary audience.

In the immediately foreseeable future, the computer screen
is more likely to supplement rather than supplant the codex
book (i.e., with bound pages). Where, after all, might the
would-be programmer/novelist find an audience to accept radical
departures in reading conventions? We have already seen that
an audience of upwardly mobile, Bible-reading Protestants were
available at the birth of the English novel. Does a similar
audience exist for the computerized text? The answer to our
question is found all too easily in the education field, where
programmed texts already impart factual knowledge to students
across the country. Such programmed learning barely begins to
realize the true educational potential of the computer. Much
more is being developed in terms of leading the student to work
through problems for himself. An example of what such a program
might do is hinted at by the popular demonstration program called
Eliza, the psychiatrist. This program uses the reader's own
responses in formulating an endless succession of questions.
Instructors skilled in teaching by the Socratic method (and
such people are rare indeed) could produce programs which lead
the student through a variable dialogue, moving to the next step
in a progressive program only when a student has supplied an
appropriate response. Perhaps the student could give the right
response only with great difficulty; it might take him hours to
move from one set of questions to the next. Who would spend the
necessary hours with such a program? Apparently, an audience
already exists for exactly this kind of endeavor. The popular
"Dungeons and Dragons" requires hundreds of hours for completion.
Such "word games" require continuous response from the player
in terms of words and phrases. The usual object of these games
is the successful traverse of a maze which requires the complex
mapping of an imaginary realm. A session at the terminal
requires intense concentration. These games, now played by
buffs for mere recreation, might find a wider audience in
players who wished more return on the investment of their hours.
A valuable return might be realized if the game required mapping,
for instance, of the wanderings of Homer's Odysseus. As com-
puter teaching aids continue to develop, an audience will be
created with a taste for even more imaginative interaction, with
a plot developed through interaction between the reader and a
computer program.

Again, the creation of a new reading medium invites us to
re-evaluate the reading process. A historical perspective
helps us foresee the impact of this new technology. Words, in
addition to transferring information, allow us to interpret
events. Stated more accurately, we necessarily interpret
historical events by narrating them. Or, to take again the view
of the Post-Modernist, history is the collection of narratives
which take the place of the ever absent event. In a real sense
the act of reading always involves reconstructing (really

constructing) an event in the mind of the reader. The
vicarious experience is a central aspect of reading seized
upon by poets and novelists. Man's love of fictional works
testifies to the importance of this experience. Taken as art,
the experience of the novel is not merely vicarious; rather the
reader reads because he enjoys the experience of the work for
its own sake--and not necessarily some gain in knowledge. The
countless hours readers spend with their mystery novels might
be likened to the hours the game buff spends involved in
"Dungeons and Dragons." Given such considerations, it is not
so difficult to envision an audience attracted to an interactive
reading text, not for any educational value, but for the
experience of the thing.

In a recent article for the New York Times Book Review,[5]
Edward Rothstein describes Infocom's "Deadline" as a
"participatory novel." When I contacted Infocom it described
this software product as a detective game. Rothstein's view of
the matter may tell us more about the real future of these word
games. Equally telling are the series of Bantam books for
children, entitled Choose Your Own Adventure. The child reading
these books turns to the appropriate pages which correspond to
the decisions he makes in the story. Such participatory
stories could be programmed into a computer in a matter of a
few hours.

The computer offers the possibility of more active inter-
action between the reader and the text. This interaction might
not necessarily depend on conscious response. Reader input
might be detected through biofeedback sensing mechanisms for
which the technology already exists. All that is lacking is a
writer/programmer with sufficient skill and interest to tackle
the undertaking. A market exists insofar as almost any interesting
program can be sold through the mail these days. But what would
we call such a production, were it to appear? It is certainly
not a novel. For now, we simply classify it along with educa-
tional programs as a species of interactive literature. And
what would a literary critic be likely to say after multiple
readings of such a text? One fears the hackneyed "Its nice
of course, but is it art?"

Notes

[1] For the best account of this, see Ian Watt, The Rise of the Novel (Berkeley: University of California Press, 1957).

[2] At its inception the English novel was considered a female form; educated gentlemen read poetry. Today, the young generation of computer users is both male and female.

[3] Even photocopies are not "identical" to an original. Paradoxically, it is now possible to make copies which are superior to the "original"--they are sharper, more readable, and on better paper.

[4] The story goes as follows: A lover, forbidden to marry his true love, is forced to choose between two doors. Behind one is a tiger to eat him; behind the other is a lady whom he must marry. His true love manages to signal which door hides the tiger. The story ends by asking which door the lover will choose to open.

[5] "Participatory Novels," May 8, 1983.

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COMPUTERS, COMMUNICATION, AND TURTLE TALK

Sally Terango
Eastern Kentucky University Laboratory School

The elementary classroom can be compared to a theatre in the round with the stage set for the entrance of studies in computer literacy. The actors and directors are the children and the teachers. The audience is the public, but where are the props and where is the script? Have a little patience. The props will be supplied by public demand. The script will also be supplied by public demand but written by others outside the field of education unless educators eliminate their hesitancy about initiating computer studies.

Actually, wha: seems to be hesitancy may, in reality, be a multitude of problems which impedes the addition of another instructional component, specifically one having to do with computer literacy. This article presents a classroom-tested activity which responds to problems of "writing the script," scheduling daily instructional time, and an educationally sound simulation activity to be implemented in preparation for the time when all classrooms are equipped with computers. For enhancement of the information presented herein, the reader is encouraged to review the references listed in the bibliography.

The Idea

The idea for a simulation was conceived while reading Seymour Papert's Mindstorms: Children, Computers, & Powerful Ideas (1980). In his book, Papert describes the development of Logo, a language designed to make computer programming as easy as possible to understand (Harvey, 1982). Logo, derived from

the Greek word for thought, is particularly appropriate as a
name for this computer language because it is a language for
learning how to think (Harvey, 1982, and Goldenberg, 1982).

After the invention of Logo, Papert and others proceeded
to determine what could be done with it. From these efforts,
the geometric entity known as the "turtle" was created, and
subsequently, Turtle geometry and Turtle math evolved (Solomon,
1982). The Turtle is a wedge-shaped point which appears on
the screen. It has position and can be moved in any compass
direction. One has only to talk "Turtle" to it.

The Simulation

How can this information be applied to a simulation?
Turtle geometry or Turtle math can very readily be adapted to
simulation activities. Children are first exposed to activities
designed to teach them how to use ordered pairs and coordinate
grids. Some examples of content areas and exercises suitable
for inclusion of studies with coordinate grids are:

A. Language Arts

    1. Spelling: Assign ordered pairs of numbers to each
       spelling word, provide grids for each student, and
       ask students to locate the points designated by the
       ordered pairs and write the accompanying words at
       the specified locations. Commercially-printed
       grid paper ruled in 2-½ cm squares has been
       satisfactorily used with third grade children.

    2. Vocabulary Development: Select a list of words
       and write them at various locations on a coordinate
       grid. Distribute copies of this exercise to the
       students. On the chalkboard or on a separate sheet
       of paper, write the ordered pair for each word
       (not the words) and a definition. Children match
       definitions and words.

B. Social Studies: Learning how to use maps and globes.

C. Science: For studies of astronomy, children may use a
   grid to locate stars of various constellations. This
   may be integrated with a unit on mythology and related
   to imaginary origins of constellations.

D. Mathematics: Teach students about the measurement of angles. Within this context, introduce the degree as a unit of measurement.

Materials/Equipment for simulation

1. masking tape
2. one sheet of green construction paper
3. overhead projector
4. a transparency grid ruled to represent one that will be produced on the classroom floor
5. one marker for use with overhead projector

Preparation for simulation

1. Arrange the classroom furniture to provide a 12'x12' space.
2. Using masking tape, develop a grid on the floor by dividing the 12' square into 144 squares of 8" each (18 squares horizontally and 18 squares vertically).
3. Use the green construction paper to cut out a triangle. If you like, draw a turtle on it. This will represent the geometric entity described earlier.

Explain to the children that the turtle will respond to a few simple commands. Here are some initial commands and explanations:

FORWARD – moves the turtle forward (the direction it is facing) the number of units specified
RIGHT – rotates the turtle clockwise according to the number of degrees specified
BACK – moves the turtle in the opposite direction of FORWARD
LEFT – moves the turtle in the opposite direction of RIGHT

Procedure for simulation

1. Select a child to be the turtle. He or she then takes a position at the southwest corner of the grid on the floor. The green construction paper representation of the turtle may be carried by this child.
2. The teacher guides the child through some moves.
3. Children take turns, with the teacher guiding the turtle through various moves until all feel confident about the activity.
4. Students begin to take turns commanding the turtle to move. The turtle must interpret the commands and move accordingly. Concurrently, the teacher, using the overhead projector and a transparency grid modeled after the one on the classroom floor, is also plotting the

turtle's moves. Children must watch and compare the
two. If a discrepancy occurs, the class applies
problem-solving strategies to determine why, and
which is correct. Children take turns being the turtle,
tracing their moves on the overhead and writing turtle
"programs." Peer evaluation may be utilized to assess
programs before they are incorporated with a simulation.

Learning Outcomes

Steffin (1983) states that Logo seems to facilitate de-
velopment of certain concepts such as sequencing of events,
rigorous use of syntax, and specific vocabulary. Conceptual
development as a result of participation in simulated Logo
activities appears to parallel those concepts developed through
hands-on computer activities. Furthermore, language arts
teachers using the model described herein will discover that
correct spelling and legibility of handwriting become intrinsic
as children exchange programs for "peer proofing" prior to
implementation in a simulation. Familiar editing procedures
assume new luster during simulations where everyone observes
the movements of the turtle and where students control events.
This feedback helps in the recognition of errors and provides
a framework for stimulating the kind of reflection requisite
to making linguistic refinements for greater precision and
conciseness.

Conclusion

The effects of Logo on learning are cognitive and
effective, measureable and immeasureable. It has many applica-
tions in language arts and language teaching; however, little
has been done to apply Logo to the humanities (Kelman, 1983).
Teachers of language arts should answer this challenge by
integrating Logo with existing curriculum in their classrooms.
As this article illustrates, lack of computer accessibility need
not be a hindrance. Simulation can help to prepare for the time
when classrooms are equipped with computers or as an ancillary
teaching strategy.

The activity described in this article was utilized with
a heterogenously grouped third-grade class at Model Laboratory
School, Eastern Kentucky University. The teacher-directed
simulations occurred during regularly scheduled math periods

with additional time justified through integration with other content areas.

While children responded enthusiastically during structured situations, a high level of interest continued to be manifested as they chose to engage in further simulations during free periods.

It appears·that inclusion of computer literacy studies as an integral part of the language arts curriculum is appropriate. It not only enhances the teaching of language arts, but utilizes a prevailing technology which will have a dominant impact upon the future of mankind.

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ENGLISH TEACHERS AS COMPUTER LEADERS

Robert Lucking, Valparaiso University

Even the briefest review of the popular press provides
convincing evidence that computers have become an integral part
of our society. The Sunday magazine section highlights com-
puter camps for children which vie with basketball, tennis, and
cheerleading camps as specialized, intense weeks focused on
skills to be honed before the next school year begins. Shopping
malls now attempt to attract customers by staging computer
extravaganzas in their central areas where once we saw only
boat shows and antique displays. Less obviously, nearly all of
the major transactions in our lives involve the data-manipulation
and storage capabilities of large business and government com-
puters. However, microcomputers or "personal computers" are
those which are making the greatest inroads in the day-to-day
affairs of most of us, especially educators.

Sales of such personal computers have increased dramatically
in the past few years, swelling from a figure of 35,000 units
sold in 1980 to a projected 3.5 million in 1983.[1] Educators
have also recognized the need to involve students with these
computers, and the definition of literacy now includes a
fundamental knowledge of computer languages and operation. In
fact The Wall Street Journal recently estimated that schools
alone will purchase one million computers by 1986. In this
movement to stay ahead of the computer, the engine of the
information age, English teachers should have a clear interest
and should assert themselves as leaders of an important tech-
nological development with vast implications for learning.

While most attention on computer applications in education
has fallen to departments of mathematics, such a mingling of
discipline may be a false marriage arising from historical
interest which is no longer valid. In their earlier stages of

development, computers and computer languages were refined with
the purpose of data analysis, or "number crunching" in mind.
Today the state of programming has matured, and applications
for nearly every discipline are being formulated and resnaped.
The literature now abounds with examples of ways computers can
serve as tools to revitalize and augment the instructional
effectiveness of every English teacher. The English curriculum
is often centered on skills which can be developed and refined
through the instructional capabilities of the computer.
Furthermore, we English teachers possess precisely the kinds
of talents to become leaders in the sensible and profitable
use of computers in schools.

Computer programming, after all, involves the manipulation
of a language, regardless of whether it be BASIC, Logo, or
Pascal. Each of these languages has a well-defined syntax,
grammar, and vocabulary akin to that which has brought us to
our first calling, the language and literature of English.
While many publishers now tout their computer software with the
same promises of "teacher-proof" excellence we have long learned
to distrust, few experienced in the field of computers would
deny that a fundamental knowledge of programming is indispensable
to the confident and competent use in the classroom. Admit-
tedly, courseware can be purchased, pulled from its package, and
slipped into the drive of a machine set before a student. How-
ever, teachers who understand how that machine works and how
that program has been shaped will truly be a dynamic force in the
classroom because (1) they will not be fearful of a mechanical
malfunction, (2) they will not perceive their students as being
more sophisticated technically than they, and (3) they will
therefore be assured of student diligence and eventual success
because of their understanding of the orderly progression of
the programmed material.

With the proper introduction and training, those of us who
teach English may find that we possess precisely the kind of
expertise and perspective necessary for orchestrating the
appropriate uses of computers in schools. Interacting with a
computer in terms of programming or instruction requires dedi-
cation to the exercise of logic, forethought, and development
similar to that demanded of a writer of a cogent essay. Arthur
Luehrmann has worked with computers in education for a number
of years, and he too has observed the similarity between the
work of a teacher of computer programming and that of an English
teacher:

A students' computer program is a written record of
his or her thinking about the problem at hand. If
the thinking is confused, awkwardly expressed, or
redundant (not to mention illogical or flat out

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wrong), the job of the teacher is to notice these
things, point them out and suggest a clearer way
of thinking about the problem and writing it down.
English teachers do exactly that when they read
student papers. Computer teachers can learn a
lot from English teachers. They should be ready
to say, "Jamie, I don't care whether the computer
understands this mess. Rewrite it so I can
read it."[2]

Computer use and computer programming both require great
attention to detail, as well as sensitivity to the balance
between rigid discipline and creative expression. The closeness
of the demands of computer programming to the ability to excel
in English was a poignant finding of research conducted by this
writer. In a mandatory program of computer literacy for 500
ninth-grade students, all participants were asked to rank their
previous level of success on a 5-point scale, first in mathe-
matics classes and then in English classes. Analyses of these
data indicated that previous success in English classes was a
better predictor of success in computer programming than was
previous success in mathematics classes.[3] The process of
writing an idea in prose for human understanding appears more
closely related to the process of writing programs intelligible
both to a computer and to other programmers than has been
previously acknowledged. Further research on the nexus between
prose composition and computer programming may explain the
complex dimensions of the relationship, but the requisite skills
are similar.

Moreover, English teachers may find that not only is their
expertise suitable to the development of programming skills but
also that the computer is a helpful instructional tool. The
number of software packages, or courseware as they are called in
the business, for English teachers has increased rather
dramatically over the past several years, and the quality has
also improved. A variety of companies have developed "basic
skills" disks which take students through routines focusing on
such fundamentals as capitalization, punctuation, and usage.
These rudamentary skills are those we have often taught
impatiently so that we could get on to more exciting facets of
English instruction: writing and considering literature. The
computer, of course, has infinite patience, and because of its
ability to respond cumulatively to each student's input, it is
absolute in individualizing the instruction it delivers. Many
of the earliest instructional programs were drill and practice
routines which took all students through every exercise; however,
more recently devised programs, known as branched tutorials,
test a student's knowledge on a given concept and then "jump"
to the point in the material which the student may not yet have

mastered. With this latter approach, a teacher can manage
instruction at as many different levels as there are students.
These programs, of course, are designed to supplement a
teacher's instruction, not replace the teacher, in what is known
as CAI, computer-assisted instruction. Research on this
approach has demonstrated some remarkable learning gains on the
part of students involved in its use. In summary, students
using CAI tend to learn more, retain more, and learn faster
than students who receive traditional instruction only.[4] With
these kinds of research results, we can scarcely shrink from
learning more about the expanding uses of the computer,
especially in light of the massive criticism presently being
leveled at educators.

One of the most natural sources of interest for the English
teacher in the computer's range of capabilities is its potential
to serve as a word processor. While a few portable "lap
computers" are being manufactured with word processing
capabilities built in, most require a program which converts
the machine into a manipulator of text. Former President
Jimmy Carter received some notoriety a few years ago for writing
his memoirs on a word processor, but these applications have now
become so ubiquitous among business and writing people that the
authors who insist upon pounding out their prose on a manual
typewriter are viewed by many as quaint but eccentric
anachronisms.

A computer with a word processing package allows the writer
to shift the order of sentences and paragraphs, and because of
the ease in making corrections with these programs, revision
becomes a much simpler, more inviting task. Already publishers
have developed simplified word processing programs designed
specifically for students, and some of these programs include
instructional materials which emphasize specific writing skills.
Among these various skills are sentence-combining activities
which show considerable promise. Additionally, heuristic,
prewriting programs which query the writer about his chosen
topic and ask for supporting details, organizational patterns,
and stylistic considerations are being field-tested by a variety
of colleges and universities; unfortunately, most of these
programs are not yet available on the commercial market.

With this range of possible assistance available to the
English teacher, we cannot afford to carry on the thinking of
the recent past when computers were viewed as the province of
"those people in the Math Department." With the rapid expansion
of computer applications, we dare not separate ourselves from
the training necessary to operate and program computers with
competence. Granted, this training, whether undertaken alone
with one of the many good books available or in an inservice or

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college course format, is time-consuming and often frustrating.
However, because the nature of our expertise matches the intel-
lectual demands required of higher level computer uses and
because our instructional needs can be met so readily by a
computer, we should stand side by side with our colleagues in
mathematics engaged in the careful consideration of computer
applications. Eventually we may well find that we possess the
mettle of computer leaders.

Notes

[1] A. J. Weiss, "The Revolution Around Us," _Training_ 1983,
20, 42-47.

[2] Arthur Luehrmann, "Slicing through the Spaghetti Code,"
The Computing Teacher, April 1983, 10, No. 8, 9-15.

[3] Robert Lucking, "An Analysis of Young Adults' Attitudes
Toward Computers," Paper delivered at American Library
Association 1983 Conference, 1983.

[4] Gerald W. Bracy, "What The Research Shows," _Electronic
Learning_, 8, November/December, 1982, 51-53.

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THE UPDATED 1984 STUDENT WRITING CONTEST

January 15, 1984, is the new postmark deadline for entries
in all categories of the KCTE Student Writing Contest: poetry,
short story and drama, critical essay, and vignettes and
descriptions.

Let your best writers have the chance to glow on Awards Day
1984. Be among those teachers receiving the new KCTE certificates
to present to student winners. Let the other students see those
students' joy from viewing their writing in print as they are
presented the 1984 Student Writing Issue of the Kentucky English
Bulletin. Share your joy with the principal as you have him or
her sign the certificate with you.

Be confident. Join the 44 teachers who submitted the 416
entries in the 1983 contest. Include the work of your younger
students, for the ratio of entries to winners in 1983 was 9th
grade, 9.4%; 10th grade, 10.9%; 11th grade, 11.7%; and 12th
grade, 10.4%.

Begin collecting your students' best writing now. Prepare
the typed manuscripts with title (repeated), category, name of
student, grade, English teacher, school, and principal listed on
a separate attached card (to facilitate coding for anonymous
judging). Avoid deadline hassles by forwarding the works now to
the contest coordinator: Dr. Fran Helphinstine
                             UPO 1244
                             Morehead State University
                             Morehead, KY 40351

The Kentucky Reading Journal announces a call for papers for two
special issues:

Spring 1984 - USING LITERATURE TO ENHANCE THE READING PROGRAM

The Spring 1984 issue of the KRJ will focus specifically on the
topic of using literature to enhance the reading program. Articles
discussing ideas and activities are welcomed by the editor.
Possible topics might include:
    1. bringing the classics into the language arts and reading
       class
    2. the role of the readers' theater, creative dramatics,
       and puppetry
    3. using literature to achieve multicultural goals
    4. literature as a springboard to creative writing
    5. focus on a single book and good ways to use it
    6. pairing genres to aid interpretation, (i.e., science
       fiction and science fact)

7. nonfiction trade books to enrich content learning
8. involving parents in the classroom through story time
Deadline for submission is December 1, 1983.

Spring 1985 - THE STATE OF READING IN KENTUCKY

The Spring 1985 issue of the KRJ will focus specifically on the
topic of the state of reading in Kentucky.
Deadline for submission is December 1, 1984.

Form should follow APA guidelines. Submit three copies and a
self-addressed envelope to: David M. Bishop, editor
Northern Kentucky University
276 BEP Building - Ed. Dept.
Highland Heights, KY 41076
(606) 572-5229

Exercise Exchange is a biannual journal designed to foster an
exchange of practical, classroom-tested ideas for teaching English
at the secondary and college levels. The journal is seeking
articles from classroom teachers on any aspect of teaching
English--language, media, writing, literature, speech. Articles
should be concise but fully developed explanations of specific
teaching strategies and activities. The magazine particularly
welcomes manuscripts from teachers who have not previously
published. Guidelines for manuscript preparation are available
on request as is editorial assistance. Subscription is $3 for
one year or $5 for two years to individuals. Institutional rates
slightly higher. Direct all inquiries, manuscripts and sub-
scriptions to Exercise Exchange, Department of English, Murray
State University, Murray, Kentucky 42071.

CALL FOR MANUSCRIPTS

The Committee on Classroom Practices in Teaching English invites
educators at all levels--elementary, secondary, and college--to
submit manuscripts for the 1984 Classroom Practices publication,
which will focus on the theme, "New Approaches to the Classics."
Articles should describe in detail a single lesson, method, or
strategy that represents a new approach to either an "old" or
contemporary classic. Keep in mind the many new developments in
the teaching of English language arts over the last decade. We
especially welcome submissions which describe classroom practices
with children's classics. Manuscripts can range in length from
two to ten double-spaced pages. Two copies should be submitted,
with the author's name and address appearing only on a title
page attached to the front of each copy. Manuscripts should be
mailed before November 1, 1983 to the committee chair, Candy
Carter, P.O. Box 2466, Truckee, California 95734, not to NCTE.

ANNOUNCING A NEW JOURNAL--
COMPUTERS, READING AND LANGUAGE ARTS

Computers, Reading and Language Arts (CRLA) is the first
educational journal to concentrate on the use of computers in the
language arts. CRLA will emphasize non-technical articles with
clear classroom teaching implications for both novices and
experienced computer users. The journal will provide information
on the practical uses for computers in teaching basic language
arts skills. Future issues will deal with topics such as using
computers to help teach spelling, punctuation, creative writing,
vocabulary development, and reading comprehension. In addition,
reviews of software, books, curriculum methods, and materials
will be presented.

CRLA is a quarterly journal. For individuals, a one-year
subscription is $14.00. The subscription rate for schools,
libraries, and other institutions is $18.00. All subscription
orders should be sent to CRLA, P.O. Box 13247, Dept. N, Oakland,
CA 94661. (Checks should be made payable to CRLA.) Manuscripts
should be sent in triplicate with a stamped return envelope to
the same address.

CALL FOR ARTICLES

The Kentuc'y English Bulletin is seeking articles for two
special issues   ;-85:

FALL 1984--WRITING BY IMITATION

Imitation, a classic technique for the teaching and learning
of composition, is having an exciting revival, as teachers of
both "creative" and "expository" writing, at all levels, are
exploring new uses of models. Articles that report, evaluate,
or further this revival are sought.

WINTER 1984-85--TEACHING ENGLISH IN A NUCLEAR AGE

Nuclear arms are the subject of increasing attention
throughout the world and are sure to be a major issue in the
1984 presidential campaign. To what extent should the issue of
nuclear war be brought into English classrooms? What impact can,
or should, it have on our teaching of language, literature, and
composition, at all levels? Articles on these and related
questions are sought.

Deadline for both issues is August 1, 1984, though inquiries
after that date are welcome. Manuscripts should follow MLA
style, as well as the NCTE Guidelines for Nonsexist Use of
Language, and should be sent, in single copies, to Ken Davis,
Department of English, University of Kentucky, Lexington, KY 40506.

The Spring 1985 issue will consist of winning entries in
the KCTE Student Writing Contest, so no need is anticipated in
1984-85 for articles on subjects other than those announced here.