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WRITING USING COMPUTERS:
CREATING THE USER-FRIENDLY WRITING CLASSROOM

A Thesis
Presented To The
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
English Composition

by
Theodore Patrick Phillips
September 1994

WRITING USING COMPUTERS:
CREATING THE USER-FRIENDLY WRITING CLASSROOM

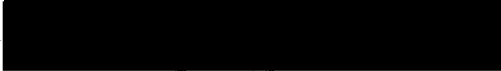
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September 1994

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ABSTRACT

Since the mid 1980's there has been a tremendous amount of research conducted on the subject of writing using computers. Much of this research has been referred to by Deborah Holdstein and Cynthia Selfe as a 'second generation' look at computers and the writing process. What makes this research different from its 'first generation' predecessor is a perceptual shift in the role of the computer from some kind of miracle machine to that of an interesting and unique kind of writing tool. Second generation thinking no longer accepts the notion that computers can somehow transform poor writers into good writers. Computers offer a unique way for writers to engage the act of writing, but the field of Composition Studies and researchers such as Janet Emig and Elaine O. Lees offer the strategies for helping student writers understand, approach and take part in the writing process. Together, composition research and computers are uniquely positioned to co-exist in a writing classroom, for the purpose of helping student writers embrace the writing process in a positive way.

The freedoms which computers offer a student writer through the 'virtual text' of word processing and software programs designed to supplement the invention, composing, revision and editing parts of the writing process, can change the way students approach the writing process. Instructors who have a process-based approach to writing instruction, who have a willingness to work closely with their students, who

have taken time to become computer literate, and who are willing to make changes in the classroom environment will find computers to be a valuable writing tool for students in their classrooms. Ultimately, computer writing classrooms seem to change from an environment which is often isolating to one which is extremely collaborative, due primarily to the response of students to a computerized environment.

By evaluating recent composition and computer writing research, this thesis provides a comprehensive look at how instructors, students, computers and the writing process interact within a composition classroom. It is intended to help secondary and college level instructors, regardless of teaching experience within such a classroom, approach and design a writing classroom that is user-friendly to all of its participants.

If a writing instructor has a sound process-based composition strategy in place, is willing to become computer literate, and is willing to address and consider what has recently been learned about how computers help facilitate the writing process, this thesis will offer a perspective from which to begin computer writing instruction, some new approaches to computer writing instruction, and a glimpse at a new era of computer writing instruction.

ACKNOWLEDGEMENTS

I would like to thank my wife, Joyce, for her willingness to endure the life of a 'thesis widow,' for her unconditional support throughout this obsessive project, and for the fulfillment she brings to my life. To my children, Ashley and Theo, thank you for somehow understanding that when 'dada' was working on the computer I could not color with you. To my parents, thank you for always being there for me and planting the seeds of learning within my soul.

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INTRODUCTION

Though "Writing Using Computers: Creating the User-Friendly Writing Classroom" has evolved often during the past year, the underlying premise remains: computers can be effective tools in the teaching of writing, and there is certainly a better way to approach the use of these machines than has been done in the past. To that end, this thesis is offered not as a dictate of how computers should be used in a writing classroom, but how they might be used. Certainly my own experience and those of the researchers included within this thesis agree that no one really knows the best way to use computers in a classroom setting, but to ignore what these experienced educators have to say promotes an attitude which has already placed public education far behind where it could be today. The following then is a comprehensive look at how composition-based pedagogy, computers and the classroom environment can be used for the purpose of creating a computerized writing environment which is both effective and user-friendly to writers.

Chapter I addresses the need for instructors to develop a sound pedagogical foundation for the teaching of writing in both computerized and computer-less classrooms. Considerations for developing a pedagogy which addresses this need are offered through the evaluation of a composition-based instructional strategy and evaluations of the theories and

methods of composition researchers Janet Emig and Elaine O. Lees. The implementation of a composition-based instructional philosophy is offered as a very effective pedagogy for enhancing the learning process of students in both traditional and computerized English classrooms.

Chapter II is devoted to evaluating the most important tool computers offer the writing instructor and student: word processing (WP). To that end, an extensive explanation of the opportunities WP gives to writers in both the creation and editing processes of composing is given. This overview covers the rationale for using WP in the writing process, the fundamentals of WP, the four types of creation programs currently available for today's writing classrooms (Questioners, Outliners, Databases, and Activity Disks), a rationale for using editing programs, an evaluation of text editing and analysis software, and strategies for evaluating software programs in regard to their usefulness within a writing classroom.

Chapter III looks at the impact computers have on the environment of a writing classroom, as well as how different computers and peripheral hardware affect that environment. This chapter offers information on the seemingly inevitable effect computers have on a classroom's social structure, a look at current debate within the computer writing community in regard to which type of computer (IBM or Macintosh) is

preferable for use in a writing classroom, the equipment minimally necessary to get a computer classroom up and running, and an overview of how peripheral computer equipment can impact the classroom.

It is my sincere hope and desire that the information contained within this thesis is of value to both novice and experienced computer-using instructors. I firmly believe that by obtaining the kind of information gathered here, teachers may be able to produce successful outcomes for themselves, their classrooms, and their students. With any luck, this kind of information might help an instructor gain the kind of access to computers that I now have: four of my five high school English classes are now spending 80% of their time in a computer classroom which gives each one of them a computer of their own to use.

CHAPTER I — PROCESS AND PEDAGOGY

Computers, Writing, and the English Classroom

Since the mid 1980's, a huge body of knowledge has been produced on the topic of computers and writing. One of the results of this work has been the emergence of what Deborah Holdstein and Cynthia Selfe refer to as a ('second generation' approach to using computers in the writing classroom (1). Simply stated, this new attitude re-acknowledges the indispensable role of the instructor in the teaching of writing.) Though this may (and should) be a given, writing teachers have had a tendency to assign too much responsibility to the computer for educating students in the writing process (Holdstein and Selfe 2; Barker and Kemp 4). This type of ill-guided pedagogy has left a trail of dashed hopes, too few successes and virtually no bragging rights for those writing teachers who invested a great deal of their time and energies in trying to make computers an effective part of the education process. And though there are numerous reasons why computers have had such an uncanny ability to get teachers to step aside in the instructional process, fundamental to most of these reasons are a lack of planning, education, and familiarity with computers on the part of the teacher.

Fortunately, despite an irritating inability to quantify the positive results they perceived when observing

students interacting with computers, many writing teachers had the desire to continue working with these machines. These teachers eventually discovered that by dis-empowering the computer as a focus in their classrooms (thereby re-empowering themselves and their students), satisfying results began to occur more consistently in their writing classes. For example, by understanding how the conventions of writing on a computer differ from those of pen and paper, an instructor can better integrate the strengths of computer applications into the instructional process and avoid frustrations likely to occur when asking students to perform tasks on a computer which are both inappropriate and counter-productive to the writing process (Selfe, "Redefining Literacy" 11). Essential to the success of the "new" approach is a reoccurring need to embrace necessary changes in classroom dynamics. Many provocative and challenging pedagogical perspectives have been added to that body of knowledge referred to as Composition Studies as a direct result of embracing this new mindset. (Barker and Kemp 1-27; Dobrin 40-57; Eldred 210-218; Fortune 145-161; Schroeder and Boe 26-46).

Unfortunately, many writing instructors have little opportunity to review the work of the researchers listed above or of what has been discovered about computer writing instruction in the last five or six years. And that time

period virtually encompasses the entire 'second generation' body of knowledge. With this in mind, there is a very real danger that those who are fortunate enough to be teaching in computer classrooms will spend needless time spinning their wheels as they attempt to re-orient themselves (and their students) from pen-and-paper to virtual text effectively.

However, it is not necessary that English instructors live the fate of being frustrated computer writing instructors. Armed with some insight into what has worked and what has not, teachers can create effective computer writing classrooms. By lending an ear to those who have succeeded (and failed) in finding effective ways to approach computers and the software which runs them, the computer writing teacher has access to a wealth of perspectives which might decrease the time spent awaiting results which are not possible, given the tools employed. The bridge between the experienced writing instructor and the effective computer writing instructor is neither excessively long nor of vertigo-inducing heights. Like any other new teaching method, learning to teach with computers must begin with a fundamental understanding of what it entails. This thesis is designed to promote this kind of fundamental foundation for teaching writing with the help of computers.

To this end, the first necessary step to integrating computers in English classrooms has little to do with the

machine itself, but with developing a sound pedagogical foundation which is also coincidentally, 'computer-friendly.' To exemplify this, I will discuss Janet Emig's article, "Writing as a Mode of Learning," and Elaine O. Lees', "Evaluating Student Writing," to show how composition-based instruction works in a computer-less English classroom. It is working instructional philosophies, such as theirs, which give viable alternatives to the literature-based instructional mode of today's educational community (especially in California's K-12 public schools).

It is my contention that composition-based instruction can satisfy both fundamental curriculum concerns and adapts to the computer classroom far more effectively than a curriculum that places interpretation of literature at the core of its agenda. Understanding that the above assertion may be debatable within the field of English research and current writing theory, this thesis cannot begin to extend its scope into this controversial and often disputed area of composition research without digressing into the lengthy and complex explanations necessary to do the topic justice. Therefore, I will proceed with the understanding that a composition-based approach to writing instruction may conflict with some of the theories of English instruction currently in favor within the educational community. In proceeding then, it must be understood that there is a

continuing debate with the English community in regard to composition-based versus literature-based instructional pedagogies, and that I will be examining the issue of computer writing instruction from the first of these two philosophies.

A Composition Pedagogy Integrated with Computers

Teaching writing with computers is still teaching writing. Computers are very powerful and sophisticated information filing systems which, once understood, have the capacity to enhance both a writer's ability to create and an instructor's ability to guide a student through the writing process. Computers should not be feared by writing instructors, but embraced with the healthy skepticism, experimentation and good sense most effective teachers engage in whenever a potentially powerful new teaching tool is put in their capable hands. Good writing instructors and computers can co-exist without compromising the quality of instruction or student achievement. As simple as this sounds, it is often not the case in computer writing instruction.

In keeping with the sentiments just mentioned, few experienced teachers would simply open an unknown new 'teaching kit,' glance over it, then make it an integral part of their classrooms. Unfortunately, this is what often happens when teachers receive their first classroom computers. Having waited anxiously, sometimes for years, to get computers into their rooms, well-intentioned instructors can easily fall into a technology-induced coma. Often, having little more than their own experi-

ences with computers to guide them, these technologically recharged instructors launch into lessons and activities that have been awaiting implementation for years, only to discover their students can't find the 'ON' switch (how soon we forget our first frail attempts at trying to get these things to produce something readable).

It does not take long for a teacher who lacks a fundamental knowledge of how computers behave in a classroom to discover that computer programs are often limited in applications consistent with the curriculum, their students' computing skills, or teacher expectations. The less-publicized, daily struggles associated with teaching via computer can also bring disarray to the classroom in the form of crashing hard drives, lost floppies, broken keyboards, dysfunctional mice, and somehow, the resurrection of the apathetic student. It does not take long for instructors to discover that their new computer-equipped classrooms are not the same anymore. Somehow, their rooms have gotten louder, less organized, and they are now focusing more on the machine than the subject matter.

Having taught and observed computer writing instruction in both English classrooms and writing labs, I am comfortable in suggesting that the problems just mentioned--and the initial mania of teachers which usually

precedes them--are typical of computer classrooms throughout our schools, if for no other reason than the lack of experience most teachers have working in a computerized classroom. In light of what I have seen done with these machines, teacher dissatisfaction with computers is not surprising. However, since most teachers seem to be almost genetically skeptical of new products which promise to revolutionize student achievement, the disregard for very basic and critical preparation before putting a computer classroom on-line is especially disturbing. For some reason, the idea of restructuring a classroom with computers does not spark the type of skepticism and 'show me' attitude that other far less dynamic pedagogical changes usually elicit in teachers.

As briefly mentioned above, perhaps because most instructors and administrators who are enthusiastic about bringing computers into the classroom have learned how to 'tame the beast,' they often forget that they've never done this before, but see little need to consult those with computer teaching experience until their classroom begins tearing around the edges, or worse yet, until it is in total chaos. An apparent in the computer's power to solve a myriad of problems in the classroom allows these enthusiasts to forget the intense planning which

usually lies behind good instruction. Careful planning has little to do with altering how we teach simply because we have a new tool (computers), but is planning which concerns itself with more effectively gearing the curriculum to, and creating appropriate activities for the strengths of the tool(s) available. In the case of teaching writing on computers, the kind of planning just mentioned would seem to require that the instructor take a hard look at what kinds of instructional strategies might ease writers' transitions from pen-and-paper to computer writing. For example, the ease with which changes in a text can be made when writing on a computer might make increasing the number of revisions required by instructors on a text an effective strategy for using computers to help students better understand the nuances of revision in a way that pen-and-paper would be unable to accomplish. On the other hand, allowing students to place unquestioning faith in a computer's ability to edit their texts could bring potential harm to students interacting with computers during the writing process (a more detailed explanation on both of these issues is addressed in Chapter II).

Writing as a Mode of Learning

Although only recently accepted by traditionally literature-based K-12 English departments, Composition Studies offers English teachers a new perspective for teaching students competence in the language arts. And it is only with the last decade's advances in computer writing software, that instructors really perceived how adaptable composition-based instruction would be to the integration of computers into English classrooms. The obvious relationship between writing and word processing would be one example of the ease with which the process of writing fits into the world of the computer. But there are also some not-so-obvious components of composition-based instruction which, through they are enhanced by the computer, are of merit solely for what they offer the learning process.

In "Writing as a Mode of Learning" (1988), Janet Emig evaluates the advantages of learning through writing. By pointing out the obvious differences between the cognitive processes needed to engage in any of the four generally accepted modes of communication--reading, writing, speaking and listening--Emig quickly establishes speaking and listening from reading and writing by referring to the widely accepted linguistic notion that speak-

ing and listening are learned through acquisition, reading and writing through systematic instruction (85).

Furthermore, Emig notes that writing is the only activity of the four which incorporates both creation and a tangible recording of the activity:

An additional distinction, so simple it may have been previously overlooked, resides in two criteria: the matters of origination and of graphic recording. Writing is originating and creating a unique verbal construct that is graphically recorded. Reading is creating or re-creating but not originating a verbal construct that is graphically recorded. Listening is creating or re-creating but not originating a verbal construct that is not graphically recorded. Talking is creating and originating a verbal construct that is not graphically recorded (except for the circuitous routing of a transcribed tape). (86)

Venturing further into the cognitive engagements unique to writing, Emig cites differences between writing and the other creative communicative act--speaking. The distinction is especially relevant to English instructors (and lay-persons) who too often oversimplify the seemingly parallel processes of writing and talking. She points out that writing is an artificially learned skill, requires a highly active engagement of cognitive processing, tends to be a more committed act than speaking, and must provide its own context, for a generally absent audience. Conversely, speaking is a natural and sometimes irrepressible act, tends to be less concrete and

accountable for its product than writing, and leans on the environment for context and feedback (87).

Looking next at terms and ideas more familiar to those interested in the learning process, Emig discusses different modalities of learning and how these modalities can be called upon most effectively by engaging in the writing process. Using Jerome Bruner's categories of learning (7-8) as a reference to ideas offered by researchers such as Jean Piaget and John Dewey, she explains that through writing, one engages in 'enactive' learning (learning by doing), iconic learning (learning by depiction of an image), and symbolic learning (learning by restatement in words) in a simultaneous or near-simultaneous fashion. This engagement of all three types of learning processes while writing makes for "a uniquely powerful multi-representational mode for learning" (88). In other words, using writing as the means for learning engages students in the learning process at an unusually opportune time: when they are in a highly aroused cognitive state of mind.

Emig makes a compelling argument for writing as the preferred method for inviting the writer into the learning process. Certainly, the idea of activating as much of the brain as possible while attempting to learn a new

concept, method or idea would seem appropriate to more effective and efficient learning of the concept, method or idea. Therefore, if writing engages more cognitive functioning than the other communicative learning modalities (speaking, listening, reading), should not this modality be the centerpiece of the language learning process?

It is my contention that: 1) focusing on writing is a highly effective method for learning English, and; 2) the computer offers a readily compatible tool for teaching English, and particularly writing, if proper care and planning is given to understanding how this technological tool can be utilized in the classroom.

Whose Paper is it Anyway?

Although there are many strategies which a composition-based instructor might use to implement an effective English/writing program, there are several obstacles inherent in giving writing a primary focus in a generic classroom:

- 1) The incredible number of papers to be graded and critiqued--in my case, five high school English classes averaging 33 students, at four different levels: Seniors, Freshman, Freshmen Honors, ESL;
- 2) Lack of time or individual attention to students is also a problem--individual conferencing for a class can easily fill up a week;
- 3) Heterogeneous classes add a dimension of drastically different abilities within individual classes--even special education students are fully integrated into many classes.

To build instruction around the writing process in a situation like mine might border on insanity, yet this is exactly what I do, and it is far from insane.

To be fair, I do not exactly follow the example given above. The primary alterations are as follows:

- 1) I allow my students to revise every assignment as many times as they choose;

- 2) I assign an average of 5-7 essays a semester (as well as another 10 or so shorter writing assignments);
- 3) I require a written response in all of my assignments;
- 4) I give a final exam which is comprehensive for the course and student responses generally average about two and one-half pages;
- 5) I spend less out-of-class time on my classes than most of the other teachers in my department.

My classroom, designed as it is, is based upon the methods of evaluation described by Elaine O. Lees in "Evaluating Student Writing" (263-67). Lees' method looks at evaluating student texts from seven different perspectives: Correcting, Describing, Emoting, Suggesting, Questioning, Reminding and Assigning (263). Each of these methods promotes a different level of responsibility for responding to the writing act for both teacher and student. Lees' philosophy, simply stated, says that I am not responsible for writing my students' papers. This sounds fundamental, yet is profound in how it alters my role as an instructor. If given the opportunity to be

combined with a computerized classroom, this alteration in the classroom dynamic is very 'user-friendly'.

As critics who meticulously peruse student texts in search of misspelled words, dangling participles, incomplete sentences and split infinitives, English instructors are often viewed as perfectionists. Unfortunately, my experience as both an English student and colleague forces me to agree with this stereotype. The philosophy inherent in this kind of evaluation presupposes that all student texts (even drafts) are finished products, and any competent writer desires a completed text to be free of errors. This type of evaluation focuses primarily on the surface features of a text. Lees calls this method of evaluation 'Correcting' (264).

According to Lees, English instructors who use Correcting as the focus of their evaluation strategy are taking on an inordinate amount of responsibility for a student's writing. Lees believes that such a pedagogy relies heavily upon the instructor pointing out surface errors of a student's paper in accordance with the teacher's own preferences. In that sense, Correcting does communicate information from teacher to student, but the kind of information being related can be misleading and contrary to the writing process. Surely, as Donald

Stewart points out in, "Some History Lessons for Composition Teachers," no competent English instructor wishes to send students messages that might be interpreted as meaning that a grammatically correct paper is necessarily a good paper (17), that the best way to improve one's writing is to master a particular set of stylistic conventions (18), that mastering surface-level errors will transform a poorly worded draft into a polished, rhetorically challenging text (19). Aside from these questionable presumptions, some interesting questions might be asked. Is proofreading unfinished texts as final drafts in the best interests of the students' perception of themselves as writers? Should an instructor enable students to forego their own proofreading by doing it for them in the drafting stages of a text? Is it the instructor's responsibility to, eventually, write the paper correctly? I think not. I think, as do Lees and Emig, that there are more effective ways of teaching students how to create and compose their own thoughts into their own words: to use writing as a mode of learning.

Two other methods of evaluation which Lees sees as contradictory to inviting students into the process of learning how to write, and think, during the writing process are Emoting and Describing (264). These two

methods of evaluation are somewhat similar in their messages to the student writer, yet they differ in how they deliver the message.

When an instructor uses Emoting as a method of evaluation, the writer gets the satisfaction of knowing that the teacher has had an emotional response to the text. Emoting typically appears on a student's papers as short, ambiguous words or phrases such as, "Nice!" or "Good" when done in a positive way, or "So what?" and "Finally, the point!" when the teacher does not like what has been done. In terms of helping a student discover what a particular teacher believes to be 'good writing,' this form of evaluation is a step forward from Correcting because the student is getting some kind of qualitative information about the context of the paper. The down side of Emoting is that the instructor is taking on the responsibility of determining the quality of the work, based upon the instructor's reading of the work, while the student is left trying to figure out what exactly was nice or good. What can a student do with this type of information to improve the text in progress? Will the student now focus only on those conventions the instructor finds "Very Nice"?

When Emoting, the instructor may unconsciously (or consciously) step on the student's paper (and thoughts) in order to verify the worthiness of the components (words, sentences, paragraphs) contained within, regardless of the student's opinion. This type of focus is not based upon what has been learned in the writing, but on what emotional response the student can solicit from the 'expert.' In Emoting, little is offered to help a student learn how to write more effectively.

When Lees' third identified mode, Describing, is used as the method of evaluation, the teacher subtly shifts from the surface of the text to its context. This type of critiquing allows the instructor not only to Emote, but to explain the Emoting as well. An example of Describing might be, "This is somewhat repetitive and tiresome," or "You are misrepresenting the theme of the story." Finally, in Describing, some explanation of how the paper fails occurs but the instructor is still taking responsibility for determining what should or should not be done to the text. Describing does offer the student insight into how a paper might be received but does not teach the writer how to change the perception of the paper for an audience.

In general, Lees sees Correcting, Emoting and Describing as ways in which a teacher maintains control of a student's writing (265). The controlling natures of these three types of evaluation styles force the student to bend to an instructor's vision of how the paper should read, to guess what is good or bad, to strive for external validation of worthiness, to compete with a specialist in writing technique and grammar. If taken to extremes, the result of this kind of unbalanced competition may give students little reason to write for their own purposes since they are not being rewarded for that type of work (Horvath 271). However, they are learning to write the way a particular instructor believes is correct, in a way which demands individuality and creativity give way to artificial conventions and instructor idiosyncrasies, in a way which enables them to release the responsibility of good writing to the 'expert'. In using these three evaluative styles, any ideas the student may have of writing through problems or exploring ideas is stymied by a lack of instructor direction and information about how to better address, organize, or perceive those problems. Many of us learned to write under just this type of duress and, unfortunately, many students today have not escaped this fate

(White 286-87). With the exception of a spelling or grammar checker, a computer in classrooms using these types of evaluation would be of questionable value to students, and the equivalent of a nuclear bomb (aimed at student papers) for the teacher.

Unlike Correcting, Emoting, and Describing, Lees' next three methods of evaluation, Suggesting, Questioning and Reminding, begin to shift the responsibility of writing the text back to the student (265). These modes begin to give the student a real say in what should and should not be done to a work in process.

As a method of evaluation, an instructor uses Suggesting to offer some strategy, wording, focus, etc., which might not have been considered by the writer. The biggest obstacle to effective Suggesting has to do with the balance of power inherent in a student/teacher relationship. If the student perceives a teacher's suggestion as a command to integrate the suggestion into the paper, Suggesting will fail. It will fail because the very notion of suggesting implies that the recipient of the suggestion has the power to ignore it. It is not enough that the instructor sincerely give the suggestion without covert implications, the student must perceive it that

way (265). If a teacher compromises the Suggesting by using it as a way to control the student's paper, then the teacher digresses to a form of Correcting.

To allow a student to override a teacher's suggestions requires that two changes occur in the classroom dynamic. Teachers must sincerely relinquish power and control over what students do, therefore acknowledging that students may know what is best for their text. And second, students, in ignoring the suggestion, must be willing to accept responsibility for that decision without feeling a penalty will be paid for simply executing their right to intellectual freedom. If these two things occur, then something very subtle also occurs, the acceptance of revision as part of the writing process is validated. It is validated because Suggesting also presupposes that the work is not being judged as a finished product. When these last two perceptions are acknowledged and accepted by both teacher and student, the revisory power of word processing becomes an effective and appropriate tool in the writing classroom.

When Suggesting is an accepted method of evaluation in a computer writing classroom, any paper (if written on-line and saved) can be retrieved and easily revised to address the suggestion(s). By not having to deal with

the drudgery of re-writing an entire paper to accommodate suggestions, student writers are free to ponder the suggestions of both teacher and peer for the purpose of making changes where they feel appropriate. Suggesting invites writers to evaluate what they have written, offers an opportunity for rebuttal and perhaps, even the beginning of a textual dialogue of sorts between the writer and the suggestor. Though this kind of transformation can occur without a computer, it is the computer and the power of word processing which will facilitate this change in a way with which pen-and-paper cannot even begin to compete.

Lees' next mode, Questioning, allows the instructor to lead a student into a more complex (or simple) way of looking at contextual concerns in a paper. By initially asking non-rhetorical questions of the writer about what is being communicated in a paper, a Questioning instructor can challenge students to expand or contract what they've done. Questions such as, "Which 'he' are you referring to--John or Jim?" invites writers to re-evaluate how they are handling their subjects. "What old man?" lets students know they have forgotten to orient their readers. If done in a non-threatening and inquisi-

tive manner, Questioning gives students the opportunity (indeed it is implied) to revise the text for the purpose of making it more understandable for a reader.

Questioning can become more rhetorical as a work progresses, thereby soliciting clarification of an argument or idea. As with Suggesting, Questioning invites the writer to compare reader responses to their own perceptions of what the written text was supposed to communicate. As an added implication, the writer, in choosing to respond to the inquiry, takes an active role in responding to a dynamic audience. With time, Questioning will promote the writer's responsibility to anticipate the inquiries a reader may have, as well as addressing higher-level, rhetorical concerns. For an instructor, using Questioning implies revision and allows for individual evaluation specific to each work. For students, Questioning communicates that the teacher is addressing, among other things, what is being communicated (topic), how it is communicated (organization), and where the communication is centered (focus). In Questioning, a writer's sensitivity to audience is guided towards an end more satisfying than mere external praise: that of attempting to communicate effectively. In this method of evaluation, questions and revisions need only

end when the writer decides to quit working on the piece, or is satisfied that 'the bases have been covered.' This type of revision has always been possible, but never as available to the student as now, with a computer.

Reminding, Lees' sixth evaluative mode, is a way of calling attention to the conventions of the class, the student, or the instructor in a non-threatening way. A Reminder can be as simple as: "I sense you lost sight of the question," or "Maintaining a consistent point-of-view throughout can help avoid confusion in the reader." In some ways, Reminding might be similar to Correcting, but the instructor is engaged more in helping the writer stay focused than pointing out an implied ignorance to fundamental writing concerns, such as grammar.

Suggesting, Questioning and Reminding all require the writer to cognitively respond to a critique without dictating how that response should be accomplished (265-6). The responsibility for determining how to respond to any of these three evaluative modes lies squarely with the writer, not the teacher. As an instructor, not having to write the paper for the student permits focusing instruction on those things which make for effective writing: consistent tone, clear focus,

logical organization, individuality of thought, validity of argument, or anything else the student writer appears to be struggling with in a paper. With these methods, students are given the opportunity to experience the self-empowerment that comes from creating a unique thought or idea and effectively communicating it to another. With any luck, accomplishing this kind of communication will also help writers to more fully understand and interpret their own ideas for themselves (Flower and Hayes 99). With a computer, the ability to really work through these modes with a student places the physical aspect of rewriting into more balance with the creative aspects of writing.

Lees' final mode of evaluation, Assigning, is an interesting and demanding method of criticism. It requires a perceptive intuition on the teacher's part (to make an acceptable assignment out of the previous one), and a willingness to explore on the writer's part.

Much like Questioning, Assigning asks writers to comment further on their work, but the comment is intended to solicit a new and separate work from the original. The idea is to take a student text and turn a component of that text into another assignment. For example, "Your comparison of Pinocchio's nose and the

vulture eye in Poe's story as outward signs of conscience is intriguing. Would you be willing to write a paper on how conscience defies repression?" The objective of Assigning is to challenge the student to further investigate the perceptions, ideas, motives, etc. communicated in a text by trying to get a student to see how those ideas generated for one purpose might lead to other concepts worthy of exploration. Assigning, then, offers students a pathway from inside their text to considerations outside the text.

Assigning challenges instructors to offer up an acceptable assignment for students to pursue. It is also a way to help students learn how to create from themselves by fostering the origination and prewriting process. In a very powerful way, this type of evaluation allows students to perceive how complex and capable they really are as independent thinkers and writers.

To use Assigning as the preferred method of evaluation in a writing class requires students to willingly work through their own very complex thoughts and ideas, as well as challenge motivated writers to really work at writing and re-writing their thoughts on paper. It is very difficult to imagine an average student doing this

over and over again on a typewriter or in long hand, but on a computer, thoughts and impressions can be examined, altered, changed at will, or merely saved for a later piece. Ideally, through Assigning, students can learn to give assignments to themselves, thereby reducing the need for an instructor in exchange for a collaborator. We might then elevate them from the status of novice 'idea suggestor' to that of 'apprentice writer.'

Throughout "Evaluating Student Writing," Lees suggests that the more willing instructors are to give student writers power and responsibility in their papers, the more likely those students will be to learn how to use that power and responsibility for the purpose of effective communication. Lees believes that teaching someone how to write effectively means teaching someone how to take an active role in their writing, and that little benefit is derived from critiquing drafts as if they are finished products. Lees believes there is a time and place for teaching good grammar and conventions, but Lees believes that those issues should not dominate the teacher/student relationship.

In respect to Lees' philosophy of evaluation, I believe good writing occurs through a process that begins with Assigning and moves towards Correcting, not in a

linear fashion, but as a dance from general to specific. Teaching student writers how to write in this fashion is certainly different from the stereotypical methods most of us learned by, but I have found it to be an effective way to turn apathetic writers into students who have something to say. I also know from my own experiences that teaching writing in this fashion can be done without computers, but as mentioned, not having the availability of word processing greatly hampers the process.

Considering how adaptable the philosophies of composition researchers such as Lees and Emig are to the English classroom, word processing should be an English teacher's dream, but this has not been the case in education (Herrmann "Computers in Public Schools" 111). One of the reasons for this lack of computer integration may have to do with trying to teach writing through a literature-based pedagogy that focuses on simple right answers produced in a single draft. Composition-based pedagogy however, allows for the change in classroom dynamics computers will inevitably impose on the English classroom. Such a pedagogy, combined with the perceptions of instructors who have experienced teaching with computers first-hand, offers a unique opportunity to build upon the knowledge of both of these instructional

communities, for the purpose of improving the way we, as English instructors, practice our craft. To that end, it is now necessary to turn towards the technology itself and to those who have real experience using it.

CHAPTER II — WORD PROCESSING

Preparing the Computerized Classroom

After establishing a composition-based pedagogy, the next step to computer integration in the writing classroom is evaluating and selecting the tools necessary to implement an effective instructional program. At this point, choices can easily become too technologically influenced (Schroeder and Boe 28) and it is important that the instructor not lose sight of the purpose for the choices in the first place: to create an effective and user-friendly writing environment for the student and a manageable instructional platform for the instructor.

As is the case in any classroom, the problem with integrating new strategies and tools into the learning environment is that each new part is likely to have an impact upon others. Minimally, creating a computer classroom requires evaluating software, hardware, and both physical and pedagogical environmental variables. I will address each of these concerns and their relationship to composition theory in an order which I believe prioritizes evaluation with respect to the act of writing. To that end, I will proceed first with an evaluation of word processing software and discuss its relevance to the writing process, then evaluate classroom pedagogy and physical design as influencing factors within computer writing classrooms and

finally, make an evaluation of the two generic types of computers available for use in the classroom, as well as look at peripheral computer equipment which can help make computers an effective part of the writing process.

Why Word Processing?

Aside from the obvious invasion of technology into our daily lives, at some point one must ask, why should students (or teachers) learn to write with computers? The answer, word processing (WP), is arguably the single most important tool the computer brings to a writer and the writing process (Barker 15; Hawisher "Studies in Word Processing" 25; Selfe and Wahlstrom 260). Few who have even a smattering of competence in using WP would voluntarily return to the hindrances which pen and paper or typewriters impose upon the writing process. This preference for WP resides in the surrealistic qualities of 'virtual text'--words that appear on a computer screen are not really there, but merely representations of how the words might appear on paper--which allows anything to be quickly and efficiently changed at anytime during the writing process. This virtuality gives writers incredible freedom to manipulate and play with language.

For both experienced and beginning computer users, WP allows writers to be less concerned with many of the physical limitations associated with writing, such as needing to reproduce an entire page because of one error, or resisting experimentation with a new idea, word or phrase because of the impact it will have on what has already been committed to paper. These freedoms, as well as others which are

delivered to the writer via WP software, replace energies wasted by writers on the restraints of text permanence (physical re-writing) with more quality time available for creating, revising and editing texts. More than anything else, it is this virtuality of WP programs which lays the foundation for using writing as a mode of thinking and learning (Wresch Practical Guide 14).

Still, even with many glowing testimonials available from those who understand how to use WP as a tool in the writing process, full integration of computers and WP into the writing classroom seems years away from being a reality (Herrmann "Computers in Schools" 110) And, despite what those of us who are experienced WP users intuitively believe to be true, that WP has had a positive impact upon our writing practices and helps us to produce higher quality texts, there is no definitive research to substantiate this intuition. This, even though there has been a great deal of research devoted to trying to prove the superiority of writing on computers to those utilizing more traditional methods, but to no avail (Curtis 377-44; Hawisher 44-69; Herrmann 123-34; Selfe "Technology in English Classroom" 118-139; Solomon 27-44). This lack of 'proof positive' to suggest that computer writing improves the quality of written texts is considered by many computer writing researchers to be more a result of using traditional methods

of evaluation to measure the nontraditional settings and tools of computer writing, than of the computer's lack of usefulness for a writer (Hawisher "Research Recommendations" 57-64; Herrmann "Computers and Writing Research" 126-28). Fortunately, even though composition researchers have been stymied in their attempts to 'prove' that writing on computers can be directly related to higher quality written products, I have seen no evidence to suggest that writing with a computer produces any lasting negative consequences for the writing process.

Even if no evidence exists that using a computer as a writing tool improves student texts, I am uncertain that any other writing tool has been proven to increase writing quality. If, on the other hand, one were to look at the writing process, and how understanding that process correlates to higher quality texts, writing on computers has certainly been proven to have a positive impact on the behaviors of writers. Some of the most notable effects computers have on the behaviors of writers (especially student writers) that do have a positive impact on the writing process are offered below:

- 1) Working on computers tends to increase the amount of writing students produce (Barker 15; Schroeder and Boe 40; Womble 76; Wresch Practical Guide 9);
- 2) WP has a positive effect on student inventiveness

- and planning strategies (Barker 15; Womble 77);
- 3) Under the right conditions, using computers promotes student collaboration in the classroom (Herrmann 131);
 - 4) Computer use seems to improve student attitudes towards writing (Lindemann and Willert 53; Schroeder and Boe 40; Wresch Practical Guide 9);
 - 5) Once computer competence is attained, student worktime becomes more productive (Schroeder and Boe 42).

As can easily be seen in the list above, the changes in student behaviors that can be attributed to writing on computers are significant to the writing classroom. I would challenge any writing instructor to refute their desire to observe all of the above behaviors more often in a majority of their students.

Still, even though WP has positive effects on student writers, it is important to note that WP can also present some obstacles for the writing process, especially in the beginning stages of learning to use it. Interestingly enough, some of the problems that can make using WP difficult for both instructors and students have little to do with WP itself, but with the machines on which it runs. More surprising than the idea that an unfamiliar machine can adversely effect the writing process of an author is that

most of the literature pointing out the obstacles WP poses for writers is generated by experienced computer writing instructors who are unfailing advocates of computer writing. Almost without exception, these veteran computer writing instructors are unwilling to let the down side of computer writing go uncriticized out of a desire to help those interested in teaching with WP avoid some of the heartache they endured as 'first generation' computer writing teachers. In my opinion, their insight and experience are of great value not only before instructors enter a computer writing environment but before they begin seriously evaluating computers (or WP) as a writing tool, as well. Therefore, I will proceed with a few of the more universally discussed problems related with initially trying to teach writing in a computer classroom before explaining WP in detail. In this way, a rudimentary understanding of how misuse of this tool, whether intentional or unintentional, can serve to defeat the goal of writing and teaching effectively with computers.

As already mentioned, merely putting a student in front of a computer loaded with WP software will not necessarily improve the quality of a student's writing. To further this point, the presence of a competent and attentive instructor during students' acquisition of WP competence is an absolute necessity (Hawisher and Fortune 283; Stillman 20; Thiesmeyer

85). The need for this teacher presence occurs because even though unaided students can and will muddle through the process of learning how to use WP as a writing tool, without instruction in how to effectively utilize the advantages of WP applications in the context of the writing process they are often doomed to having their writing digress in quality long before returning to their pre-computer competence levels (Sommers 3). In other words, WP skills must become incorporated (taught) into a student's schema of the writing process if they are to effectively integrate it into that process.

Though the above may seem elemental, users new to WP are often new to computers as well, and therefore need to obtain competence in both computer and WP skills simultaneously. This creates an interesting dilemma for any computer writing instructor: teaching computer skills or even basic WP skills is not what we as writing instructors are trained to do (or may want to do), but if we want to teach students how to effectively write with computers, then we must teach these skills to our students. This dilemma is often compounded by writing instructors trying to teach the writing process at the same time students are trying to learn basic computer skills, which is possibly the equivalent of trying to teach the essay to someone trying to learn how to hold a pencil. For all of the above reasons, teach-

ers should be sympathetic to students' initial frustration and apparent incompetence as they attempt to learn fundamental WP skills. This last point is especially true for instructors who do not wish to discourage writers attempting to control the computer so they can engage the writing process. Lees might consider being too critical of students' writing competence at this stage of computer writing to be equivalent to using a Correcting mode of evaluation on a first draft.

From my own experience, I know the computer will win the battle for student attentiveness during the initial stages of computerized writing instruction anyway, and like it or not, writing instruction has to take a temporary back-seat in the classroom until students have learned to be comfortable writing on-line. Fortunately, how long and how serious this digression from writing instruction will last can be directly influenced by the teacher. Cynthia Selfe and Billie Wahlstrom believe that student preoccupation with the computer increases in direct relation to a teacher's preparation for teaching in a computerized environment--the less prepared a teacher is, the greater the potential for student focus to be on the computer (266-68). In order to avoid student (and teacher) obsession with the computer, many experienced computer writing instructors have identified the necessity for getting students competent in WP as

quickly as possible, so that the primary task of teaching writing can resume (Bernhardt and Appleby 146; LeBlanc and Moran 114; Selfe and Wahlstrom 266-68). Shirlee Lindemann and Jeanette Willert also point out that the complexity of the software being used in a classroom, and how it is employed, can play a significant role in putting undue focus on matters unrelated to writing (47).

As presented in the last several pages, teaching students how to use the most effective writing tool computers have to offer, word processing, requires instructors to address obstacles to teaching writing that have little to do with writing or writing theory. But, if these non-composition issues are not at least fundamentally understood by those who desire to integrate computer writing instruction into their classrooms, then they risk turning both their students (and themselves) away from the advantages of using WP in the writing process in favor of older, more comfortable, and less dynamic methods. Fortunately, the experienced instructors who have lived the horrors of entering computer classrooms unprepared for these hindrances have studied and shared their insights for those who would follow them into a computerized teaching environment. As writing instructors, having at least a fundamental understanding of how computers and WP software can influence our classrooms gives us a perspective for critically evaluating what we

want: students writing with the tool, and what we do not

want: students focusing on the tool.

Writing and Word Processing

Essentially, word processing is a generic term for those activities which involve the manipulation of on-line text during the writing process. WP does not actually do any writing for a writer but it does allow words to be presented onto a computer screen in a form similar to words on paper. As mentioned previously, this occurs without the usual concern for form and physical work that changing words committed to paper normally presupposes. In a way, what WP does is allow writers to 'unload' thoughts, ideas, and phrases from their mind to a clipboard of sorts (prewriting) thereby freeing up cognitive processes for the purpose of developing those ideas into a more appropriate form: creating drafts (composing). These drafts can then be altered, saved, or combined until ultimately a finished product results (revision). Finally, at the point of text completion (or at anytime during the process) WP programs can assume many burdensome error detection and proofreading needs much more quickly and efficiently than a writer could normally manage independently (editing). In other words, WP is a writing tool that has the ability to participate in all of the generally accepted 'parts' of the writing process (North 23).

Though computers loaded with WP software can be of great help to a writer during the writing process, it cannot

compose. For that reason, in a quest to satisfy the needs of people who desire to write but cannot do so to their own satisfaction, software manufacturers have created many kinds of WP programs to 'help' writers produce finished texts. This software can be classified into two basic types: programs that help the writer create and programs that help the writer edit.

Unfortunately, as John Thiesmeyer points out in "Should We Do What We Can?", the degree to which programmers will go to create the illusion that the more WP functions a writer has, the better a writer's writing will be is considerable (78-80). Not surprisingly, these programs tend to be very expensive, especially those programs that have 'intelligence.' The implication of this for student writers and their instructors is that they can easily be seduced into believing that WP software alone can increase writing quality. But, if one is armed with the knowledge and presence of mind to ignore the inflated testimonials of software marketing strategists and use WP in an appropriate manner, these programs can be useful tools in teaching and learning the writing process (Thiesmeyer 89-90).

Initially, learning to write via WP requires developing skills that are not necessary for writing with pen and paper. One of the first problems encountered when learning how to write with computers has little to do with working on

writing, but understanding and gaining control of basic functions essential to creating a WP document. Minimally, these skills involve learning how to use and control each of the following functions to manipulate what has been written on-line: moving text, deleting text, searching text, replacing text, and moving within a text. This need to take charge of WP software lies at the heart of differences between specific WP programs, and it is usually the ease with which the writer can access any one of these basic functions or the number of available advanced formatting functions, that differentiate specific WP programs. Yet for all of the good that advanced features offer a writer experienced in WP, the array of choices available in today's WP software can quickly overwhelm a person new to the tool, and are of questionable value in the creation stage of the writing process (Spitzer "Writing On-Line" 31). Indeed, a great deal of literature has been generated on just how much, and how fast, beginners should learn all of the applications WP has to offer.

Michael Spitzer, chair of English at New York Institute of Technology, was one of the first researchers to break down the functions of WP software and how those functions are utilized by novice, intermediate, and advanced writers. In "Selecting Word Processing Software," Spitzer points out that even novice computer writers need a large assortment of

WP options to begin creating text on a computer, yet can have their writing adversely affected by software too complex for their needs (36-39). This sheds light on a basic and fundamental learning dilemma student writers are asked to resolve when learning to compose on-line: 1) how to write without the conventional tools of writing (pen and paper); and, 2) how to navigate thoughts through the new tool (keyboard and screen) in order to produce a text. As one begins to understand the complexities of this true paradigm shift--changing from a method of writing which is often as physical as it is mental, to one which is predominately mental--it becomes easy to understand how quickly information overload can hamper the composing process.

One researcher who has addressed the issue of how students translate the conventions of pen and paper writing to that of WP is Cynthia Selfe, associate professor and director of the Scientific and Technical Communication program at Michigan Technological University. In "Redefining Literacy: The Multilayered Grammars of Computers" (1989), Selfe defines conventions as, "grammars or formats which govern such things as arrangement, structure, form, and appearance of a text" (5). Selfe points out how some of the very basic skills learned for the purpose of communicating through 'print literacy' are challenged by those of 'on-line literacy.' This clash of literacies can have a direct

impact upon skills necessary for engaging in the composing, revising, and editing portions of the writing process by forcing the writer to address visual and spatial distractions such as: moving words, pages which change in content, visual distractions not seen on traditional writing surfaces (menu lines, cursors), a different sized page (now 4x3 instead of 2x3).

Selfe believes one of the implications of these on-line writing distractions may be a change in the way writers interpret writing altogether ("Redefining Literacy" 5-6). This interpretive change forces a writer to compose and edit in two different modes, on-line and hard copy, thus creating a 'multilayered' literacy which requires specific skills in reading, writing and editing both on and off-line (11). Essentially then, writing on computers may reshape (possibly re-invent) the way writers approach, conceive, carry out, control, and complete their texts. If this is true, then the implications of on-line conventions on the writing process may ultimately force both writing instructors and students to rethink the conventions of teaching/learning the writing process (Selfe "Redefining Literacy" 11). This may also mean that future writing instruction will require addressing search, replace and find functions a parts of the writing process, or even the development of new strategies designed to help writers cope with composing on-line, such

as teaching students formatting strategies that make on-line text more readable. Cynthia Selfe is not the only researcher to see changes in the way writers must approach composing on-line with WP.

Christina Haas in "'Seeing It on the Screen Isn't Really Seeing It': Computer Writers' Reading Problems," describes four problems directly related to reading text on-line that cause difficulties for the computer writer: formatting, proofreading, reorganizing and critical reading (19-27).

Haas notes that formatting difficulties seem to be brought on by the reality that most papers written on-line are intended to be read on paper. For that reason, writers must spend a great deal of time converting text to hard copy, in order to 'see' how it really reads (20). Proofreading concerns are generated by writers' general mistrust for what they see on the screen (20). This mistrust is the result of writers missing mistakes on-line that are easily spotted on hard copies. On-line reorganization difficulties, while not a concern for word and sentence-level changes, often become incredibly complex tasks when several paragraphs or large sections of text are involved (21). This problem of reorganization can be directly affected by the kind of WP functions available in a WP program. Critical reading or 'text sense' difficulties related to writing on-

line can make it difficult for writers to get a 'true' reading of their work while it is on-line. This is apparently due in part to the problems of interpreting the conventions of the screen (17). Text sense problems seem to be most prevalent when writers are attempting to put into language new ideas or concepts which have not yet been completely formulated in their thoughts. Haas points out that experienced writers who have a good idea of their own composing habits are much more adept at adapting their own idiosyncrasies to the problems associated with on-line writing than inexperienced writers, who may not be able to form these types of adaptations without the help of someone who can help them understand and find solutions to these problems (27).

Selfe and Haas convincingly argue that adapting to the conventions of 'on-line literacies' can (and does) create problems for both beginning and experienced users of WP when participating in the writing process. Their research may shed some light on the work of Elizabeth Sommers' investigations into the problems of digression in both the writing quality and writing practices that writers new to computers often experience when initially confronted with WP (3). The work of these three composition researchers, as well as others, may be at the heart of why one of the most widely accepted methods for teaching students how to incorporate WP

into the writing process is to offer them only what they need, when they need it (Wresch Practical Guide 13). It is then, after fundamental competence has been achieved, that teachers can offer students a more individualized kind of instruction which maintains a focus on writing. The alternative to this kind of pedagogy seems to be time wasted putting out the fires students tend to create for themselves by getting into WP 'traps' created when using functions they do not need or understand.

The reward for allowing students to learn WP at a comfortable pace may be an instructor's participation in the reshaping of writing literacy and the writing process within their own classrooms. An example of this is reported by Cynthia Selfe who, along with other instructors at Michigan Tech, has observed student writers become the true experts of on-line writing ("Redefining Literacy" 12-13). At Michigan Tech, instructors began to notice their students developing new kinds of writing strategies designed specifically for making on-line text more reader-friendly. These strategies included the use of flashing notes to draw attention to specific portions of a text, and the use of different colors of text as visual cues in compare and contrast papers (12-13). Writers also seemed to write shorter paragraphs solely for the purpose of accommodating the limits of computer screens, and 'page-up' and 'page-

down' commands (12).

Certainly, the types of creative text conventions these Michigan Tech students have created would be impossible for students to integrate into their texts during the beginning stages of learning WP, but it is obviously possible (and probable) that with WP experience, students can learn how to engage in different, yet effective new forms of written communication. In fact, Selfe notes that students who tended to rely on hard copy to read computer generated text were at a disadvantage when trying to read these on-line drafts (12).

Another very subtle aspect of what these Michigan Tech students have come to understand somewhere in the writing process is the need for making their texts both accessible and understandable to their audience in a way that is exclusive to reading on-line. These kinds of perceptive strategies by our emerging generation of 'computer-age' students will probably teach us 'dinosaurs' how to communicate much more effectively on-line than we might have learned without their technologically modified insights. Indeed, conventions such as those used by students at Michigan Tech may become an essential part of future writing competence, especially as our culture continues to move towards reliance on electronic media in our daily communications.

Word Processing Software and Composing

As noted in the last section, using WP as a vehicle to creating text on a computer is, at least initially, no simple task. But once writers become competent with WP software, they can do far more than merely getting text onto the screen and turning the keyboard into a fancy typewriter. Still, even with a fundamental understanding of how to write using WP, computer writers must deal with some on-line literacy problems which can interfere with the writing process. These problems can interfere with utilizing WP's basic function: writing on-line. In some ways, WP programs which have been created by software designers to assist in the composing process can help computer writers alleviate some of the problems associated with organizing and creating a writer's text. These kinds of software packages are probably best categorized as 'prewriting' or 'invention' programs. Invention programs begin to make use of the computer's limited artificial intelligence capabilities as a tool for helping writers generate and develop ideas, organize thoughts and text, and address their audience from different perspectives.

Though it would be a tribute to software manufacturers if these invention programs were designed specifically for addressing the needs of computer writers from a process oriented perspective, for the most part this is not the case

(Thiesmeyer 76). In "Should We Do What We Can?" John Thiesmeyer points out the software industry's penchant for adding unnecessary, yet seemingly impressive functions for text manipulation into WP software, not for what these functions can do for a writer, but because they are possible to do: Programmer Joyriding (76). It is joyriding that creates problems for instructors trying to initially limit the functions available to student writers in an attempt to make the transition from pen and paper writing to computer writing less overwhelming. Joyriding forces the evaluation of WP software to become a critical part of an instructor's task when preparing to teach students how to write with computers.

Perhaps one of the best ways for instructors to approach the joyriding problem is to remain loyal to those writing theories which address the creation and prewriting process consistent with their own pedagogy, thereby eliminating from consideration those programs which do not seem to relate to these theories. With this kind of perspective in force, writing instructors might look for creation programs which allow students to make their own meanings through writing as opposed to simply finding them (Flower and Hayes 92). Instructors sympathetic to researcher Sondra Perl, who does not see idea-making or composing as a linear writing process (113-118), would probably look for a

creation program that allows a writer to use the invention portions of the program at any time during the process of composing. Instructors who, like Donald G. Marshall (159-182), see interpretation as the primary focus of the writing act would obviously look for a program that promotes the interpretation of ideas for an intended audience as part of its programming. Regardless of one's instructional philosophy, it is important that instructors understand what a particular program is intended to do, as well as how its programming goes about that task. Otherwise, instructors may end up with a program that does not approach the writing process in a manner consistent with their own methods, or process-based instruction, which can create confusion for students who must address these inconsistencies in the classroom.

Essentially, there are four types of prewriting or invention programs: Questioners, Outliners, Databases, and Activity Disks (Wresch "Practical Guide" 35, 1987). These programs attempt to assist writers by mimicking those things good teachers do: direct activities, suggest strategies, play audience; or helping writers clarify ideas by acting as an audience of sorts (Strickland 68-70). Interestingly, the thing which makes these things possible, the limited artificial intelligence of the computer, is exactly what causes most researchers and educators to respond negatively to

them. In other words, the misguided notion that a computer can teach things instead of (or better than) a teacher leaves a nasty taste in the mouth of even a burnt-out educator.

Despite the fear of many educators, I do not believe that invention programs were ever intended to replace good human writing instruction (a far too complex task for the limited capabilities of an essentially 'stupid' computer). Rather, I believe that these programs were designed to assist and free-up writing teachers (and students) from the drudgery of always having to lecture an entire class in the complete workings of a particular method or strategy. As most educators know, this type of overview often leads to long and boring monologues which students care little for, until they need the information during hands-on experimentation with the concepts. What invention programs can do is provide a method for students to individually engage in a particular prewriting strategy quickly and with relatively little pre-activity pain. These programs can also increase the availability of an instructor for students engaged in trying to learn how to prepare themselves for writing a text by helping the instructor get out of lecture mode, and allowing the computer screen to help focus students on the task at hand. Meanwhile, teachers are free to roam the room assisting students as necessary.

Provided an instructor does not turn on an invention program and walk away, the activities provided in these programs could easily solicit discussions about writing, such as how a particular kind of prewriting method works (or does not work), how limitations in the software do not allow for strategies which students would like to experiment with, or any number of other issues which come up as the students work through a program's scenario. Probably the most important thing to keep in mind when having students use these programs is that, if monitored, they will be addressing the subject matter and eventually turn to the expert (teacher) whenever the program's inadequacies present themselves.

Questioning Programs

Attempting to mimic the kinds of inquiries Lees' previously mentioned evaluative mode of the same name pursues, Questioning programs do just that--question writers about their topic. These programs are normally designed to ask predetermined kinds of questions of writers in order to solicit a response from the writers about their soon-to-be text. The difference between these programs and what Lees' Questioning mode does is ask the questions before, not during, the work in progress. Typically, a Questioning program asks students to answer questions about purpose, audience, subject and the organizational plan writers intend to use in their papers. And, though the computer's response to questions can at times be quite humorous or out-of-context, the idea of having a writer address these concerns before writing is certainly a sound instructional strategy.

Questioning programs can vary widely in their attempt to obtain information from writers and computer writing researchers who have an interest in these types of programs have several suggestions for identifying good Questioning programs. James Strickland believes that it is important for Questioning programs to offer branching capabilities and offer a high degree of flexibility for classroom use (70). William Wresch believes that, once learned, Questioners should be short enough to be used in a single class period,

and should be useful for both individual and group activities (Practical Guide 54).

On the other hand, researchers also note that problems in the limited intelligence of Questioners can make them ineffective or useless to student writers. Thiesmeyer points out that Questioners fail when they try to "engage in half of an imaginary conversation in which the writer is expected to act as if engaged in a real one," and they "seem to work better in theory than in practice" (88). Lisa Gerrard is dissatisfied with questioning programs because they tend to offer only a single approach to thinking through a problem, as well as offering responses so vague that they are useless to student writers (102-04).

Outlining Programs

Apparently, Outlining programs were first invented by business in order to keep track of information by using the computer's ability to manipulate text (Wresch Practical Guide 43). What these programs are intended to do is, "make it easy to organize sets of words, phrases, headings, sentences, or larger units into subordinated structures and to reorder those structures at whim" (Thiesmeyer 81).

Writing instructors have taught this kind of strategy for years (the five paragraph essay would be one example) and it seems logical that teachers might be drawn to them. Howev-

er, of the four types of invention programs, most of the research I have come across on Outlining programs is negative.

At the core of why experienced composition instructors and researchers seem to dislike Outlining programs is the general lack of writing theory behind them, as well as the faulty presumptions programmers have apparently built into these programs. John Thiesmeyer is especially critical of Outlining programs and blames software programmers for the inherent flaws in Outline design. To exemplify this, consider both the tone and message Thiesmeyer delivers regarding invention programs in his article "Should We Do What We Can?", which addresses the issue of software design:

...eager program designers have not questioned what abilities might be needed to formulate the content of usable outlines. By the very fact that they are not simple lists outlines presuppose high-level analytical skills. The writer of an outline must understand or create subordinating relationships: they do not adhere in the items themselves and are not created by visual rearrangement" (Thiesmeyer 81).

Without necessarily agreeing completely with Thiesmeyer, but certainly sympathetic to his attitude regarding Outliners, Lisa Gerrard also has a problem with the assumption built into Outlining software that there is only one way to plan a paper (102). James Strickland is most concerned about the process-less, linear-based approach used in most of these programs (71).

As can be seen by the tone of the comments above, Outliners are not in favor with composition researchers who are involved with studying invention software. Perhaps it is too soon in the development of invention software for programmers to design an Outliner which can address the needs of students trying to learn the concept. But, if nothing else, it would seem that introducing the concept of an outline to students on a computer may help some, entertain others, and merely be ignored by students who do not like what the program asks them to do.

Databases

Anyone who has had a successful experience in pulling needed information from a database understands the value of this tool for keeping track of and quickly accessing information. In my opinion, databases are a visual representation of what computers really do: sort and arrange information with a speed and accuracy the human mind cannot match. In discussing databases, I would like to share how useful they can be to a writer by explaining how I am using the ones I have created for the purpose of writing this thesis, rather than citing research on the topic.

Months ago, when I was preparing the research necessary to write this thesis, I began creating databases that I could quickly reference when the need for specific informa-

tion arose in my writing. I knew that by loading these files into my computer I could eliminate the cumbersome task of having to wade through index cards, books, and highlighted portions of text when I needed some data. To this purpose I have virtually instant access to no less than 20 of these information files. At this moment I have the following databases on-line and available for my immediate use: a complete list of the works I have read in preparing for this thesis; annotations of every article or book I have read in preparation for this project; a 'quick-find' file, which gives a brief description of all my annotations; by author, and title of each annotation; and the general topic of the information contained within an annotation.

By combining the above databases with files on individuals works, I can develop a file of information on any topic I choose to reference for this paper in a matter of minutes. And, because I took the time to carefully paginate each of my references, I can go directly to the text and find exactly what I need if my annotation is not sufficient for my purposes. I cannot stress in strong enough terms the freedom and increased productivity these databases can bring to a project such as this one.

Along with the files mentioned above, I also took the time to create a file I call 'Working Cited,' which is a listing (in appropriate form) of each of the texts I have

read in preparation for this paper. What this allows me to do is prepare my 'real' Works Cited as I write the thesis. I do this by: 1) finding my source of reference, 2) using it in the thesis, 3) pulling the citation from the Working Cited file, and 4) alphabetically inserting it in my preformatted Works Cited file. When I have completed this paper, my Works Cited will be completed also, and with very little effort.

These databases and text files are an example of what people mean when they talk about the 'information age.' Surely, without my computer and these files, I would be spending much more time trying to substantiate what is being addressed in this thesis. If the information contained in these files was not easily accessible, I might also have narrowed the scope of this work or been less reliable in my assertions simply because the information I needed was not at hand. Without digressing too far, this seems an opportune time to briefly mention what a modem could do to this body of knowledge--make the information to draw from virtually infinite.

As wonderful as I obviously believe databases can be in developing a text, this free flow of information does not come without cost. Depending upon the scope of a database, they require as much time to prepare as notes normally would, including reading and annotating the original infor-

mation, then organizing it in a way which serves the needs of the writer. But as a tool of learning, this kind of preparation is certainly no different than the traditional index card method--except that once completed, the information is much more accessible than when searching for information by hand. I know that I have certainly been served well by using databases in this and other writing projects, and it seems appropriate that students should be taught how to conceive and design databases in preparation for intensive writing assignments. This method of prewriting can help validate a student's knowledge of a given topic, if for no other reason than the fact that students must read, interpret and write their interpretation into language for the database. Writing as a mode of learning?

Activity Disks

Activity programs are designed to offer activities (games, exercises) to teach a component of writing (features of WP, word games, how to start a text). These kinds of programs are probably used most in the primary grades of our public schools. Basically, they are drill-and-practice programs designed to be entertaining.

What activity disks try to do, in a less painful way than traditional instructional methods, is engage the user in a fun activity that, when completed, will have increased

the writer's competence in a particular skill. Inter-activity is the key motivating factor in these programs, and they foster good results (especially in younger students) when they are used in conjunction with regular classroom teaching (Wresch Practical Guide 51).

The biggest problem with these programs is that they tend to be very limited in what they teach and usually do not allow for the sometimes necessary modifications of teachers. For example, if a teacher is unable to customize the list of words in a spelling program, the purpose of the program is defeated as an aid in learning words outside the program's word list. These programs are also very expensive, so unless they have multiple applications, they can be very cost ineffective. But if these programs can solicit positive attitudes in students towards writing, computers, or other relevant subject matter, they may be a useful novelty in the classroom.

Software Designed to Assist the Editing Process

The flip-side of WP software designed to help writers get their ideas on-line are programs which perform editing functions within a WP document: checkers and analyzers. Checkers are intended to respond to the 'form' of a text (spelling and grammar), while analyzers respond to meaning in a text--style and readability (Dobrin 40). In a limited way, 'error-correction' programs enable computers to perform some editing tasks much more quickly and efficiently than a human proofreader.

One interesting aspect of checkers and analyzers, aside from their intended functions, is the amount of controversy they bring to the field of writing research. What makes these two computer tools 'hot' topics lies in the fundamental reality that these programs are not capable of performing many of the contextual and meaning-making activities necessary for doing the things they are intended to do. In other words, error-correction software actually tries to understand a text, which is impossible for a computer to do (Collins 31; Dobrin 40-41; Hull and Smith 93-99; Ross 110; Schwartz 23). Still, despite a rather large body of research which views error-correction negatively, there is an underlying acceptance for these programs when they are used responsibly (Wresch Practical Guide 67).

Spelling Checkers

Brook K. Horvath defines summative evaluation in the following way:

Determining a paper's grade and writing comments to explain or justify that grade; deciding how well a paper measures up to one's expectations, fulfills the requirements of an assignment, meets certain criteria of good prose; in short, passing judgement, ranking: this is a summative evaluation, which treats a text as a finished product and the student's writing ability as at least momentarily fixed (268).

The idea of developing checker programs must certainly come from the summative theories of evaluation found in traditional English instruction. Just as certainly, Elaine O. Lees would take exception to using checkers in a purely summative fashion: solely for the purpose of engaging in Correcting. Just as certainly, instructors who subscribe to this kind of evaluation would see checkers as a way to lighten the load of correcting student papers by turning over to the computer the task of correcting spelling or grammar errors. To use checkers in the way just described, however, is an injustice to student writers, not only because it is an irresponsible and ignorant way to teach using checking software, but also because it merely uses a highly efficient yet deceptively error prone tool to reinforce product-based writing instruction. Checkers can be useful in the writing process, but understanding how they function is necessary to making them a useful part of

process-based writing instruction.

Responding to the form of a written text is something which a computer program can do with some success (Dobrin 40). For example, a spell-checking program can match all of the words of a text to a preloaded word inventory and 'flag' those words it does not find. This is done by matching a string of codes (words) which the program recognizes (space-c-o-r-r-e-c-t-space) with the codes of its internal database (Dobrin 43). Once 'misspelled' words have been flagged, the writer can then make individual determinations about whether a change is necessary. With an adequately sized inventory (most of the higher priced programs have no less than 80,000 words), many commonly used words, inputted incorrectly, can be flagged and fixed in far less time than a writer could ever hope to manage manually. Most spell checkers also offer three other useful functions: giving alternatives to flagged words; the making of a 'custom dictionary' for words not included within the program's main inventory; and, in the case of a word misspelled the same way more than once, checkers usually have the ability to instantly change all identical misspellings in a text with the correct word.

The problem with the above scenario, and with checkers in general, is that words are flagged solely upon whether or not they match the program's internal list of words. For this reason, spell-checkers begin to lose their value in the

writing process when their internal dictionary is small. They also lose value when they encounter proper nouns, acronyms, or other unusual words; when they encounter words which are context specific (there, their, they're); and when they encounter 'wrong' words spelled correctly (wafer for water). One of the consequences of the above problems is that the checker may flag correct words, or fail to flag incorrect ones, thereby defeating its purpose. In these cases, the writer is required to waste a lot of time sorting through what David Dobrin calls "garbage" (43). And though this is a somewhat trivial concern for texts of only a few pages, searching through this garbage when a text is tens or hundreds of pages long can be a tedious and time consuming task. Despite this inconvenience, spell-checkers are wonderful tools for the proofreading of things like typographical errors and double words because they can identify and help fix these errors without the writer having to continuously re-read a text trying to find them.

With all of the above in mind, consider the implications of students using spell-checker programs. To begin with, students often assign computers (and sometimes teachers) with a great deal of respect (Gerrard 102). This may be heady stuff for a human instructor, but a computer merely dispenses selected information without concern for competence. Therefore, if students perceive the computer as

intelligent, they may also begin to assign it intelligence when considering its output. If this occurs, then students run the risk of trusting the machine to fix what is wrong with their written texts. And to unquestioningly accept a computer's analysis, in light of the many mistakes which error-correction programs can make, writers may be naively led to a level of writing sloppiness they would never have discovered on their own, or worse yet, to passivity in their editing practices (Gerrard 101).

To overcome the problems which may be associated with complete trust of the computer, students should be instructed in exactly what these kinds of programs can and cannot do (Gerrard 98). In this way, instructors can show young writers how to take control of the machine and can perhaps even get them to open dictionaries after the software has failed a few times. In the long run, teaching students to be suspicious of computer output may help them perceive the computer as a writing tool, which it is, instead of a writing guru, which it is not (Thiesmeyer 77: 1990).

Grammar Checkers

If spelling checkers are the springboard for a leap into the pool of artificial intelligence, then grammar checkers are in mid-dive. Grammar checkers, along with incorporating all of the problems associated with spelling checkers, add new variables to the list of things which cannot be handled by a computer's 'stupidity.' The unreliability of grammar checkers occurs for the same reason as do all computer programs which try to be smart: they cannot make meaning out of the language (codes) they encounter (Collins 31; Dobrin 40; Hull and Smith 100-101).

What grammar checkers can do is analyze sentences by applying rules of English (the programmer's version) to a particular set of rules, or codes. For example, a grammar checker may perceive a sentence in the following way, "a string of 'words' concluded by a 'period,' 'question mark,' or 'colon' and two spaces" (Dobrin 42). This may be fine and good for sentences which are quite straight-forward and follow usual rules of grammar, but for sentences which require contextual insights or which apply exceptions to the usual rules of grammar, these programs quickly begin to fail in their usefulness to the writer. This is especially true if the analysis is first flawed by errors a program's spell-checker is virtually certain to make.

After reviewing a good deal of literature on grammar

checkers and then combining it with my own experience, it is probably safe for me to say that they are far more work than they are worth, and others would agree (Dobrin 45; Hull and Smith 90-92; Schwartz 23; Thiesmeyer 89-91: 1990). However, in a limited way, grammar checkers might be a useful tool for instructors to use when reviewing grammar rules or when exposing their students to the complexities of grammatically correct writing. Almost without exception, those researchers who have written on the topic of checkers insist that a breathing, competent human being be present when students are using these programs, if they are to attain any benefit from them.

Analysis Software

Analysis programs check for things such as diction and style within a text. In developing analysis programs, software programmers have reached the limits of what today's computers can do, and then have crossed over the line (Dobrin 54-56). Analysis software attempts to do two things which are impossible for computers to do: 1) understand a written text, and 2) based upon its pseudo-understanding of the text, assign some form of valid, qualitative evaluation to it. These evaluations range in focus from the use of the verb 'to be', to sentence lengths, word choice and readability indexes. Essentially, anything that can be counted, tracked or somehow put into a statistical formula has probably been considered by an analysis software writer for inclusion into one of these programs. And although a mound of statistical data on a piece of writing may look impressive, the potential value of this type of data for increasing a writer's communicative competence is virtually nonexistent (Dobrin 45-50; Gerrard 99; Thiesmeyer 84-85).

More dangerous than the lack of value in their textual feedback is the potential abuse or harm to a writer which can occur through misuse of analysis programs (Gerrard 101; Thiesmeyer 89-91). Without exception, researchers insist that very little good can come from these programs without close monitoring by an instructor (Dobrin 46-47; Gerrard 98;

Hull and Smith 92-93; Kiefer, Markel 216; Ross 109; Schwartz 19-20; Sciarone and Meijer 101). In light of the research above, and other research which I have not included for the sake of brevity, instructors would be wise to wade gently into the waters of artificially 'un-intelligent' text analyzers. Certainly though, as with any new idea or method, instructors should get some first-hand experience with these programs before dismissing (or including) them for use within their own computer writing classrooms.

A Final Comment on Software Evaluation

As can be understood by reading the preceding pages concerning the evaluation of software for the writing classroom, there are many issues which a computer writing instructor must address before including any software into the curriculum. Unfortunately, this paper (or any paper of similar length) cannot address all of the issues with the intense scrutiny teachers should employ in the software selection process. Perhaps the best piece of information that can be offered is that given by Bruce T. Peterson, Cynthia L. Selfe, and Billie J. Wahlstrom, in their article entitled "Choosing Software for the Composition Classroom." Though dated, this article still offers a very sensible and relevant perspective from which to approach software decisions for the writing classroom. Essentially, these three computer writing researchers advise selecting a software program based solely upon its relevance to the writing classroom, the writing process, and the problems instructors see in their writing students.

One final but very important issue an instructor should consider when preparing to purchase any software program is whether they can get the manufacturer to send them a demonstration copy. Although this can be a very touchy issue with software companies, due largely to the problem of illegally reproduced software cutting into their profits,

instructors should not be shy in reminding these companies of the incredible costs which are involved in purchasing software on a teacher's limited budget. In other words, being sensitive to a company's dilemma is certainly important, but as a consumer this should not be a one-sided affair. Therefore, suggesting that you may be purchasing more of their products, or offering any 'clout' which you may have in the purchasing decisions of technology at your school may help. Still, some companies will not send preview copies, nor accept returns unless the software is defective, and then they may only replace it with a new program. Either way, if the program does not meet your needs, you're stuck.

In my opinion, the solution to the above dilemma is to choose one of the following:

- 1) refuse to purchase software which you cannot first examine;
- 2) find a copy of the program somewhere and try it out before purchasing;
- 3) only purchase unseen software which has the endorsement of someone you trust (with a similar pedagogical philosophy) who has seen or used it;
- 4) gamble, and spend your precious budget on a potentially useless expenditure.

CHAPTER III — THE COMPUTERIZED ENVIRONMENT

A Shift in Pedagogy

Although a rather obvious point, the integration of computers into a writing classroom will have a profound impact upon the working operations of that classroom (Barker 7-17; Herrmann 131-32; Selfe "Redefining Literacy" 11). In that context, researchers have noted many different ways that the integration of computers promote changes in teacher roles, teacher/teacher interactions, teacher/student interactions, student/student interactions and instructional strategies. Most of these changes are apparently caused by the way instructors and students respond to the insertion of technology into the environment. Specifically, one of the most noticeable results of the human response to computers in a classroom is the development of a new, more collaborative social order (Boiarsky 50; Cooper and Selfe 867; Cyganowski 70-72; Eldred 210; Lindemann and Willert 49-50; Wresch "Lessons Learned" 94). Initially, this new desire to collaborate occurs as students turn to each other for solving the basic operational problems they encounter with the computers, then by the sudden visibility of writing displayed on computer screens, which promotes solicited and unsolicited comments about suddenly 'public' texts.

For an instructor, the obvious and simple solution for adapting to this new social change, and the one promoted by

those who have taught computer writing for years, is to allow for the classroom to incorporate a more collaborative tone. But, as will be discussed, collaboration in the computer classroom bears no resemblance to the kinds of contrived collaborative learning activities so popularly pushed in education today.

The alternative to accommodating this new collaborative environment is to continue teaching in a traditional manner despite the non-traditional variables now in the classroom. According to Barker, writing teachers who do this are misusing the computer as a writing tool and possibly reacting out of a fear that too much reliance on computers will turn the instructor into a dispensable commodity (9). Barker also notes that instructors who are unwilling to change from a teacher-focused pedagogy to one which is more student-centered are ignoring the experiences of those who have had success teaching writing with computers, as well as ignoring research which continuously indicates the ineffectiveness of education's traditional teaching methods (8-10).

Regardless of which of the two above alternatives instructors choose to use, they will begin to notice changes occurring in their classrooms almost immediately. To begin with, students instantly begin focusing on the machine instead of on the teacher or writing tasks, while at the

same time bombarding the instructor with questions about operational procedures necessary to do the most basic of WP functions. Since teachers cannot get to individual students fast enough, problem-solving interactions among the students increase, as does the noise level. With teachers distracted, students more familiar than the instructor in the operations of either the computers or the software begin troubleshooting problems for those around them. Especially when these troubleshooters are very computer literate, little time is necessary for students to understand that the instructor is not the one who can quickly solve their problems. Students begin moving around to see how something is done and asking questions from opposite sides of the room. Soon, not even the troubleshooters can keep up with the rising tide of problems. Without some kind of plan to stop this growing mutiny, a 'twilight zone' of chaos can quickly raise its ugly head within the normally serene walls of an unprepared instructor's classroom. Indeed, attempting to accommodate this initial pandemonium, which can last for days, may be pivotal to explaining why some teachers never make the transition from a traditional classroom to a computerized one (Veen 3).

The key to surviving this initial stage of introducing students to computers and returning the classroom to something which suggests normalcy lies in teaching students the

skills necessary to begin writing with the machines as quickly as possible--a primary reason why instructors need to be computer literate before they teach using computers (Rodrigues, 185). If student competence is not achieved in a timely manner, each passing day increases the distance between students and the writing process (Schroeder and Boe 33). But if a teacher is prepared to deal with the potential of anarchy and manages to get students competent enough to begin writing, the development of a true writing community is possible. However, this kind of community does not come without changes in the way students and teachers interact with each other and the writing process.

For writers in a collaborative computer writing classroom, the writing audience shifts from teacher to peer in a way more powerful and sustaining than any activity a teacher could construct. Students will still rely on the instructor for writing expertise, but there is an inevitable increase in the stature of peer criticism as inclusion of other students' opinions are both sought out and respected (Barker, 11; Boiarsky 59). Teachers also take on a different kind of role in this cooperative writing community, becoming more a part of the writing in progress than a judge of finished texts: collaborators with a respected knowledge and expertise in the writing process (Barker 14; Cyganowski 70).

It is in this kind of classroom (whether computerized

or computer-less), where students begin taking a more active role in the writing process and instructors are collaborators, that the development of practical strategies for utilizing the composition pedagogies of researchers, such as Elaine O. Lees, become realistic and possible. In such an environment, the computer in a computer writing classroom loses its appeal as a 'new toy' and becomes a means to creating writing worth writing, and writing worth reading.

When a computer classroom has survived the initial novelty of the machine and students have the abilities necessary to compose without operational intrusions, classroom pedagogy and design may determine if this new classroom will be truly process-based or just a traditional classroom disguised with technology. For those instructors who opt to design a process-based classroom some fundamental questions must be addressed. How collaborative will the classroom be? What type of physical set-up should be used? What equipment will be needed to carry out the two previous questions?

The answer to the first question above is: as collaborative as an instructor can tolerate. However, the more student collaboration an instructor permits, the less able that instructor will be to operate in the traditional, authoritarian role (Cyganowski 70-72). Instead, the instructor needs to become more a member of the writing community of the classroom, a collaborator: someone who is

expert in the writing process, someone who can suggest strategies for helping communicate the point of a text more effectively. For some, teaching in the way just described will be an impossible role to play, but those who have learned to play it are among the most satisfied reporters of computer classroom instruction (Boiarsky 47-67; Handa 169-70).

Depending upon the amount of student collaboration desired by an instructor, the physical arrangement of the computer classroom (like any other classroom) will vary. Some restraints which are not usually considerations in a computer-less classroom, such as access to electricity, creating pathways which are free of wires, electrical cords, or other equipment, maintaining large enough pathways to protect the computers from moving bodies, and the difficulty in changing the classroom's physical configuration can all have a dramatic effect upon the development of a collaborative atmosphere. The consensus for developing an effective layout in a collaborative computer writing classroom is one which allows members of the community ready access to each other, both visually and physically (Barker and Kemp 16; Boiarsky 50-55; Skubikowski and Elder 91).

Since the very idea of collaboration suggests a large amount of social interaction between members of the community, the traditional 'straight row' classroom is probably the

least effective configuration for such a community (Boiarsky 60). Therefore, instead of using a traditional configuration in a non-traditional atmosphere, several alternative physical arrangements for a collaborative computer classroom have been suggested in literature on the subject. It should also be noted that these kinds of configurations could certainly be effective for writing classrooms without computers as well.

One suggested way to configure a collaborative computer writing classroom is to have workstations arranged around the perimeter of the classroom, facing outward (Boiarsky 51). This may require a large room if student numbers are also large, but with this kind of arrangement classroom focus can be turned to the center of the room (and away from computer screens) when the attention of all is required. By placing large tables in the center of such a room, students can leave their workstations for the purpose of group critiquing, hard copy editing, or any number of activities which make working at independent workstations undesirable. Like a 'rowed' classroom, a potential problem in this configuration is the isolation of students who choose to seclude themselves in corners or resist interacting with others.

According to Carolyn Boiarsky, a classroom lay-out that can be very effective for students and teachers is one that

resembles a newspaper 'bullpen' (53). This journalistic lay-out has pods of four computers arranged in a way that allows a great deal of interaction between the members of the pod and opens up the room for freedom of movement between pods. In this kind of setting the instructor's workstation is set up no differently than the students', thereby eliminating physical boundaries between the teacher and student. With a lack of physical distancing between students and instructor, collaboration between the two allows the modeling of writing processes, such as composing, revising or editing to become more than a passive student activity. This simple rearrangement of physical boundaries is an important step for instructors attempting to alter their role from evaluator and judge to coach and collaborator (Cyganowski 71). By making this perceptual shift in their role, instructors seem better able to focus on modeling the writing process for students or assisting those engaged in the writing process (Barker 14-15). For those familiar with the techniques of teacher/student writing conferences (Murray 232-37) the pod configuration may offer some unique opportunities to engage in individualized and small group conferencing as well.

If it is logistically impossible to create the kind of physical setting just described, or if instructors are uncomfortable with that kind of interaction with their

students, networking computers in a writing classroom can maintain physical distancing between students and instructors while eliminating any physical obstacles to collaboration. Essentially, what networking will do is allow users to have conference calls within the classroom. With the right kinds of equipment, networks allow student writers and instructors who are separated by physical space to work together simultaneously on one piece of writing without having to move away from their computer screens. This type of 'faceless' communication can have a dramatic effect upon both the behaviors of students in a classroom and how those students approach the writing process.

Among other things, networked communication between students can turn any gender issues in a classroom into non-issues. For those unfamiliar with the role gender can play in a collaborative writing environment, a student's gender can incline instructors to favor boys over girls, especially if the instructor perceives computers to be tools of math or science (Barker 10). Mary J. Flores has also noted that female students tend to engage in a networked conversation more often and with more authority than in a traditional setting (109-110). Networked classrooms can also help encourage students who are too shy or embarrassed by public speaking to engage in collaborative writing activities which they might otherwise choose to avoid. Students with physi-

cal limitations significant enough to impact their ability to participate in traditional classroom interactions are also given an unusually powerful means to fully enter a classroom's writing community through net-working.

Though all of the advantages of networked communication just described are certainly important, perhaps the most important aspect of networked writing is that students must communicate on the network through the written word. This forces students who wish to communicate effectively on the network to constantly refine their writing skills, for the purpose of effectively communicating with a 'real' audience of peers.

Computer networks certainly offer some interesting twists to the writing classroom and the writing process, but they can also pose some problems for an instructor. Depending upon the members of the writing community, how they are instructed in interacting on the network, and how they actually do interact on it, any of a number of problems may arise. Some of these issues are determining who will have access to whom, when, and for what purpose (Schwartz 18-30), how does one protect the privacy rights of those on the network (Schwartz 21), and 'Flaming'. Flaming is the phenomena of an unidentified user sending inappropriate, abusive and often vulgar language to others on the network. Flaming apparently occurs at one time or another on all

networks, especially the Internet (Kuechle 18).

Depending upon the individual situation, instructor, or student population, there are some non-instructional issues which may need to be addressed by an instructor in a collaborative computer writing classroom as well. For example, some of the issues which seem to be growing in interest among computer writing researchers and instructors are access to computer classrooms for both teacher and student (Thomas and Frase 287), the privacy rights of those on-line (Schwartz 18-30), and the continuing problem of the violation of software copyrights and the theft of 'intellectual' properties on networks (Schwartz 26). Regarding these last two concerns, an article I found in the Press-Enterprise reports the recent theft of more than 100,000 passwords on the Internet by a 'loosely knit but fairly organized group of computer hackers" (A-12). If these thieves also have access to a password holder's ID they can read everything that person owns, erase it or shut down their computer. This intrusion on the rights of network users exemplifies the potential scope of the problems instructors may have to address should they enter their classrooms on networks which communicate with computers outside the classroom.

Despite all of the research being done on computers and the writing process, as well as the effects of computer integration on students, teachers, and the classroom envi-

ronment, there are very few givens. There is, however, at least one virtual certainty: computers will elicit changes in the way teachers teach the writing process. How this new writing tool will eventually change the way instructors approach teaching the writing process will be decided by individual teachers, but it appears that accommodating a more collaborative tone in the writing classroom will play an important role in this change. In the final analysis, experimenting, risk taking, and being open to a new order of classroom design may be the best advice that anyone can give to instructors who have done everything they can to prepare themselves for teaching in a computerized environment, except teach in one.

Computers and Peripherals (Hardware)

Once potential computer writing instructors have established a comfortable instructional pedagogy, have an understanding of the potential capabilities and limitations of computer writing software, and have an idea of how computers will affect both their students and their classroom, they are at least minimally prepared to begin making decisions regarding what equipment should be purchased to create the user-friendly classroom. Yet, there is still an education to be had in choosing the computer and peripheral hardware necessary to build such a classroom. In making these decisions, there are enough brands, salesmen, peer experts, and literature available on all aspects of the computer to overwhelm even a careful evaluator. Mistakes which impact pedagogical design and budgets will most certainly be made, but with a good foundation of computer knowledge to draw from, instructors may not have to walk down as many of the frivolous (and expensive) roads computer companies have paved for an indiscriminate consumer.

If an instructor can look beyond the inflated claims of a very persuasive computer manufacturing industry, critically evaluate the sometimes dazzling displays of software demonstrations (most of which usually have very little to do with teaching writing on computers), and keep in mind that a computer is really nothing more than a writing tool, it may

be possible to avoid careless computer purchases. To that end, it is important to remember that even with all of the advantages offered to writing classrooms by computers in this thesis so far: editing tools, revision devices, a more public display of writing, an invitation to collaborate, etc., all of these things can be accomplished in a computerless writing environment. What computers really do offer writing classrooms is a uniquely inviting delivery system for implementing many of these changes more efficiently than traditional writing tools. No teacher needs a computer to successfully teach the writing process, nor will computers turn a poor instructor into a good one. Good instructors use their tools well and good computer instructors are no different, except that they understand what computers are, what they can do, and how to use them appropriately.

Choosing a Computer

In today's computer world, there are currently two computer systems from which to choose when determining what kind of computer to purchase for a writing classroom (or for personal use): a system which is compatible with IBM or one which is compatible with Apple software. And though there are many companies which have 'cloned' the IBM operating system within their computers (Tandy, Compaq, Hewlett-Packard, etc.), Apple is the only company which produces Macintosh computers. Older Apple computers (IIe, IIc, IIGS) are still effective machines, but new software for these older computers is difficult to find and generally must be obtained through mail-order catalogs. For that reason, I will limit this discussion to Macintosh as the Apple product of choice.

Unfortunately, computer research on the machine itself and its effects upon writers and the writing process is still a young and growing body of knowledge. And though many composition instructors and researchers have done work on the various types of software applications available to the computing writer (word processing programs, spelling checkers, prewriting program, etc.), the physical attributes of the machines (memory, screen size and design, ability to network, etc.), and environmental factors (number per student, classroom arrangement, teacher/student roles,

etc.), this type of research is generic to all computers, regardless of brand name. In fact, the two computer types are becoming more and more similar to each other, making the decision of which kind of computer to buy somewhat insignificant. However, because this issue has recently stirred considerable debate in computer writing research, I am compelled to offer a discussion on computer types, so that an understanding can be reached of how ignorance of this aspect of the computer writing classroom can cause needless debate within schools.

Is IBM Better Than MAC?

Although anyone who has entered into a discussion about computers has probably heard glowing testimonials about the advantages of IBM computers over MACs, or MACs over IBMs, no one has come close to proving that either of these kinds of computers are any more effective for teaching students how to write than the other. In fact, the one researcher bold enough to publish a judgement on this topic, Marcia Peoples Halio, received so much opposition to her conclusion--IBMs benefit students writers more than MACs--that no less than twenty-five experienced and respected computer writing researchers joined in a unified response to refute her findings (Slatin et al 73-79). Some of the more familiar names on this rebuttal, Cynthia Selfe, Gail Hawisher and Michael Spitzer, have already been heard from often in this thesis.

In her 1990 article "Student Writing: Can the Machine Maim the Message?" Halio placed twenty randomly chosen student texts from both IBM and Macintosh computer writing classes at the University of Delaware through the 'Writers' Workbench Text Analysis' program. Next, she analyzed the mountain of statistical data this 'intelligent' program compiled on those student texts. From that analysis, she concluded that using an IBM computer was more beneficial to student writers than using a MAC (Halio 16-20, 45).

"Halio's article is so seriously flawed by methodological and interpretive errors that it would probably have been dismissed had it appeared in a journal directed to an audience of professional writing teachers" was the opening shot taken at Halio by those rebutting her findings in "Computer Instructors Respond to Halio" (73). The authors of the rebuttal claimed that the journal which first published Halio's study, Academic Computing, is written for a general audience of administrators and other non-teachers responsible for purchasing computer equipment, which could produce a significant problem for writing instructors trying to justify equipment needs. This last point is given as the most compelling reason for their collaborative response to Halio (74).

Ultimately, Halio responded in defense of her findings in "Maiming Re-Viewed" (103-07). Other computer writing researchers continue to dispute Halio's findings, and at least one, Steven Youra, has offered numerous reasons why MACs might be more beneficial to student writers than IBMs (81-88). To date, no one in the composition community has publicly come to the aid of Halio by agreeing with her conclusions, neither has anyone duplicated her study or her findings. Conversely, no one has claimed to have proven that the Macintosh is a justifiable choice in the writing classroom over the IBM, though it has been suggested in some

literature (Schroeder and Boe 30).

The one agreement that came out of all of this debate was the need to conduct more research on the affects of particular types of computers on writers and the writing process. So despite the inconclusiveness of all of this, a gap in the body of computer writing research has been identified, and it should be assumed that someone will take on the task of looking at this gap more critically in the future.

So...Which Computer Should Be Used?

Since there is not a 'correct' answer for choosing the right computer for the purpose of writing, no responsible computer writing instructor should claim students will receive increased benefits from using either MACs or IBMs. Still, the inevitable problem of 'computer loyalty' can occur when advocates for both types of computers are involved in computer purchasing decisions. If this occurs, a school site may begin purchasing technology in a haphazard fashion--the English Department buys MACs, the Business Department IBMs. This may seem harmless enough on the surface, but in regard to money and consistency within a school, will this technological hodgepodge make the school less efficient, cohesive and effective? Perhaps a school can survive this kind of divisiveness (mine has, so far) but could an individual department? Without evidence to support the superiority of one type of computer over another, a rational, cost-effective and needs-intensive plan would seem to be the appropriate course to take when deciding which type of computers a school (or district) should purchase.

Soon, as a result of the incredible speed at which computer technology is advancing, it appears all of the above discussion will become a non-issue. Apple has just begun putting into Macintosh computers its 1.44 MB Super-Drive: a device which reads IBM compatible software; this is

the beginning of the end for the compatibility issue. Also, with the latest IBM compatible programs emulating the Macintosh operating system, it seems that software design will become more standardized, eliminating the need to learn two different kinds of computer navigation skills.

As the two choice of computer types become less and less different, the only issue of real importance may be the one which has always plagued education--money. For that reason, the question of computer integration for schools appears to be: should money be spent on older, less expensive computers that are compatible with a site's existing hardware; or should money be invested in these newer 'all-compatible' machines, thereby decreasing access but increasing the usefulness of a site's existing software library? I think only individual districts, schools and departments can answer this question, but hopefully, those decision-makers will make their choices based on what is known to work in a computer writing classroom, rather than the kind of computer a selected 'computer person' prefers, or the immediate bottom line.

Hardware Needs

Once it is understood that the kind of computer most appropriate for a computer writing classroom is really a non-issue, selecting the computer hardware for a computer writing classroom becomes much easier. Basically, there are two kinds of equipment needed to create a computerized workstation: the main computer component (computer, monitor), and peripherals (printers, networking hardware, file servers, etc.). Unfortunately, the costs associated with both computers and the peripheral hardware designed for them will likely require sacrificing some of what was originally thought a necessity for the computer classroom.

Hardware choices range in necessity from absolutes (computers, monitors and printers), to wouldn't that be nice (file-servers and modems). Regardless of the availability of choices, budgeted money can disappear long before the computer classroom is complete. For that reason, this section will be an overview of the hardware which experienced instructors suggest are essential to creating a computerized classroom that is user-friendly to both student writer and instructor. But even this is not a clearly defined task, since research ranges from Schroeder and Boe's 'Minimalist' classroom, using older, still useful computers and peripherals (28-46), to the paper-less classroom of the future suggested by Cynthia Selfe, where classroom writing and evaluation is conducted completely on-line ("Redefining Literacy" 12-13).

The Basic Workstation

One of the goals of almost all computer writing instructors is to have one computer available for each student on a daily basis, even though this is generally not possible. Considering costs of from \$1,100 to \$2,500 for a single mid-level computer, getting thirty of these machines into a classroom begins with the kind of steep investment many administrators are reluctant to make. This often makes equipping a classroom with a computer for each student an unrealistic initial goal; therefore, instructors may have to put their rooms together in phases. As a starting point, the maximum ratio of computers to students suggested in the literature is one computer per three students (Wresch 26), otherwise 'musical computers' can cause real access problems for student writers.

Regardless of how many computers are being purchased, attention should also be given to the kind of monitor that will be used with them (this was not a very important decision a few years ago but now there are numerous screen sizes and color capabilities to choose from). Considering that writers usually spend more time looking at the screen than at any other part of the computer, it is surprising that more research has not been done on this very important part of the computer writer's workstation. In my opinion, required reading on this topic should be Christina Haas'

article, "'Seeing it on the Screen Isn't Really Seeing It': Computer Reading Problems."

In her article, Haas discusses the problems associated with adjusting to the conventions of screen reading (16-17), as well as research on the speed (slower), accuracy (diminished), and scores (lower), of students reading on-line (18). She points out that some of these problems can be at least partially alleviated by the physical orientation of the monitor, character font sizes and styles, and a monitor's polarity (18).

Once the central portion of a computer workstation (computer and monitor) has been completed, the next essential piece of hardware is a printer. As is the case with all parts of the computer, the different kinds of printers offer a large selection of choice regarding text quality: draft quality text, near letter quality text, letter quality text, colored text, and multiple color text. Looking past all of these wonderful 'final product' options, the number of printers available is far more important to a writer than the quality of text that a printer produces. Having one high quality printer available for occasional needs will probably suffice for several computer classrooms, unless, of course, instructors are preoccupied with product-based instruction. Low cost printers that produce texts of a high enough quality to allow for reading by instructors is all

that is really necessary. This increases the ability to purchase more printers and coincides with the general consensus among experienced computer instructors and researchers that as many printers as are needed to make printer access quick, if not immediate, is the most desired situation for a computer writer (Schroeder and Boe 30; Skubikowski and Elder 91; Wresch 27). My personal experience of teaching in a computer classroom, which has one printer connected to every four computers, has worked out quite well.

With a computer, monitor, printer, and basic word processing program, all that is absolutely necessary to operate a computer writing workstation is complete. However, to produce a computer classroom which easily allows for many of the activities mentioned in this thesis, more than one basic computer workstation becomes necessary. With this in mind, each computer added to a classroom will increase teacher/student access, increase teacher/student computer literacy, and increase student writing; it will also probably increase student collaboration, and the possibility of system breakdown. Ultimately, the number of workstations, the kinds of software available, and the intentions of the instructor are the variables that will most influence how friendly these workstations will be to a writer.

Networking Hardware and Software

Depending upon what an instructor's intentions are for a computerized classroom, putting together a classroom which gives each computer in a classroom the ability to communicate with all the others requires different kinds of hardware and software. For example, some instructors may only desire the ability to view student screens or send information from their computer to a student's. Others may wish all of the computers in a classroom to send and receive information from/to the other computers in a classroom. Still others might wish to have the ability to connect only certain computers together. A relatively new twist to these last two kinds of computerized communication is Electronic Networks for Interaction (ENFI) software, which is described in detail in Betram Bruce, Joy Kreeft Peyton and Trent Batson's Network-Based Classrooms: Promises and Realities. Essentially, ENFI allows a continuous, recorded conversation to occur on a computer network within a classroom. Regardless of the kind of computer communication an instructor desires, these kinds of computer communications require setting up a computer network.

Essentially, networks can be set up two ways: a one-sender system, which allows only one computer to communicate with or control all of the other computers on the network; or an interactive system, which allows every computer on the

network to send and receive communications with every other computer on the network. Either way, special software and cabling will be needed to get the 'conversation' started. For that, networking software and at least one computer with a large memory capacity (file server) is usually needed.

File servers, aside from simply handling the chores of computer networking, can be very useful pieces of equipment in a computer writing classroom. If the ability to use CD ROM disks is available on a file server, an incredible amount of stored information and data can be accessed by individual computer users on a network. With enough memory, a file server could contain virtually an entire school's library and make that library available to any computer writer having access to it. Though somewhat new in today's computer world, file servers offer an abundance of information at the touch of a key, and will probably play a big part in the paper-less and book-less schools which are sure to emerge in the future.

Finally, next to the computer itself, modems may be the most powerful tool available for a computer classroom. With a modem, a computer user can 'speak' to any other computer attached to another modem anywhere in the world. Modems are what make systems like Prodigy, America On-Line and the Internet possible. The information available through the use of a modem and the global networks they allow access to

is staggering. Consider the possibilities of students having access to this kind of global networking: a student survey of school dress codes from every state in the Union or every country in Europe; the possibility of getting Michael Crichton to answer a few questions about the process of writing Jurassic Park; or having students from another state or country make comments on a student's writing.

Replacing and Maintaining Hardware

Finally, I would feel guilty completing this section of the thesis if I did not at least mention an often overlooked consideration of the computerized classroom: maintenance. Even as computer equipment becomes more affordable, operating a computer classroom and keeping it running is no inexpensive task. With the probability that several different students will be interacting with a single computer on a daily basis, problems with a classroom's computers are bound to occur and equipment is going to fail. Depending upon how long a computer is down, how many computers are down, and when a computer goes down, writing instruction can inadvertently be disrupted or completely stopped.

To alleviate some of the problems associated with maintaining a computer classroom, budgeting consideration must be given to purchasing replacement hardware and maintenance contracts. And, because more and more students have computers at home but not the money to replace expensive computer parts which fail, theft of computer equipment will probably begin to increase as a problem in the computer classroom. Another problem, the damaging of computers by students with advanced programming skills, has also become a problem in the computer classrooms at my school. These student programmers have more than once programmed computers to do things which distract the writing process, like

programming a computer to emit vulgar language when a particular key is stuck, or the removal of software programs from a hard drive. These kinds of student-authored viruses are presently a mere inconvenience but could become as deadly to a computer classroom as any of the many destructive viruses currently in circulation. To help with these problems, companies have been formed to produce and offer various kinds of security devices for the safety of both computer hardware and software. These companies or their products can usually be located at computer stores, conferences, and through trade publications. Although most of the teachers I know like to trust their students, the fact is real that some cannot be trusted and instructors in a computer classroom would be wise to be aware of and ready for repairing the kinds of damage unscrupulous students will inflict upon a classroom's computers, just as they would any other kind of classroom vandalism.

A Final Word on Purchasing Hardware

Just as there is no absolute answer to which computer is best for a student writer, neither is there a formula which would suggest the kinds of hardware a classroom should have. Hopefully (but not very realistically), the instructor in a computer classroom will be given carte blanche authority to purchase whatever is needed for themselves and their students. Otherwise, it might be best to critically evaluate what it is that the classroom is supposed to do, and then create a prioritized list of minimal needs from which to begin making decisions. With any leftover funds, extra equipment can be purchased from a predetermined list of needed equipment or an evolving list of needs which grows out of actual use within the classroom.

Regardless of which methods are used to make decisions regarding the equipping of the computer writing classroom, it would seem prudent that those decisions be made from a perspective that is curriculum-based in nature (and hopefully composition-based), computer smart, and capable of adapting to future computing needs. If these priorities are kept always in the forefront of the computer writing instructor's mind, I believe those who wish to teach students how to write with computers will have greatly increased their chances of making computers an effective part of writing instruction.

CHAPTER IV -- CONCLUSION

Although there is certainly no 'right way' to teach writing with the help of computers, the last six to eight years has brought about a change in the way experienced computer educators approach instruction with this tool of technology. Described as part of a 'second generation' of computer instructors by Holdstein and Selfe (1990), these educators have come to grips with more than a few of the problems which computers pose for writers and the writing classroom. At the center of this new perception of the computer's role in writing instruction is the reassignment of the computer from 'miracle machine' to 'writing tool,' which interestingly returns the power of writing instruction from the computer back to where it belongs--with the teacher.

In returning to a place of prominence within the computerized writing environment, and by getting the focus off the machine and on to the task of writing, instructors who wish to utilize the computer in their classrooms must now come to grips with teaching writing despite the limited (and sometimes seemly limitless) capabilities of the computer 'painfully' entrenched within their instructional arena. In order to create a classroom which will allow for good writing instruction and effective use of the computer, instructors would be wise to learn from those who have

shared tales of triumph (and horror) about teaching in a computerized environment. Certainly, there is an abundance of sound, professional literature available for just such an education, yet the speed with which this information is becoming available might test the resolve of even a motivated learner. This, combined with the perceptions of those who are inexperienced with computers believing that these machines are 'smart,' combined with our culture's implied dispensability of the worker (instructor?) with a machine, may (and has) led educators to ignore and irresponsibly utilize the computer as a writing tool in the classroom.

For all of the reasons just mentioned (and others as well), it seems prudent that writing instructors, whether with computers or without, should re-evaluate their methods, tactics and perceptions of both the learning process and the way in which writing instruction is delivered. In this way, they can perhaps develop more effective kinds of instructional strategies that will increase both student abilities and instructor effectiveness. One such type of pedagogy appears to be a composition-based approach to the writing process which, coincidentally, allows for effective adaption to a computerized environment.

By allowing the computer to be a friendly tool in the instruction of the writing process, many experienced composition-based computer writing educators have begun to solicit

change in not only the attitudes of student writers, but in their own perceptions of how to effectively teach the writing process. And although no substantial data yet exists to prove that computerized writing instruction has increased student achievement, there is virtually no evidence that it will harm the student if instruction is delivered in an appropriate, knowledgeable, and conscientious manner. To achieve this level of instruction, teachers must become educated in both the writing process (hopefully a given), and in the efficient use of this new writing tool called a computer.

Although becoming computer-literate can initially be a painful task, composition researchers agree that in order to become a competent computer writing instructor (and to make learning to write on a computer as painless as possible for students), efforts must be made by those who choose to teach with these machines to become computer literate and aware of the potential harm that may result from outdated, mythological, and ineffective computerized instructional strategies. I can personally see no other way to develop competence in computer writing instruction than to: 1) have a sound pedagogical foundation from which to draw; 2) learn how to use a computer; 3) develop an understanding of how various computer environments will affect the student and classroom setting; and, 4) understand that traditional methods of

delivery may not apply when non-traditional tools are employed in the instructional process.

This thesis was designed as a tool for both experienced and inexperienced computer writing instructors (and others) to begin to address computerized writing from a second generation perspective. Surely, with the advancing speed of computer integration into our schools, society's desire for higher quality outcomes in education, and the development of two previously separate camps (computer writing researchers and composition researchers) into one community, the third generation of computer writing instruction is not very far off in the distance. To be a first generation computer writing instructor (or administrator) in the third generation arena destines our students (and schools) to a level of mediocrity comparable to writing on a typewriter. Hopefully, those who have read this thesis have a better understanding of how user-friendly computers and computer writing classrooms can be if a competent, knowledgeable individual is in charge.

The empowerment that writing can offer those who learn the craft has rarely been disputed (see Plato: Phaedrus), and learning how to practice the craft with the most efficient means available has always intensified and refined that empowerment. The computer appears to be just such a tool. Learn how to use it and you will empower yourself, learn how to teach with it, and you will empower others.

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