Foreword

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This book stands as a testimony to change and to the role of teachers in making change. It attests to the productive agency that teachers, students, and program administrators can exert at the intersection of two powerful and complex educational movements—when writing-across-the-curriculum (WAC) classes begin to take advantage of innovative computer-supported communication environments and become what the editors of this book have termed *Electronic Communication Across the Curriculum* (ECAC). The important ECAC case studies that the editors and authors have provided here add to our profession's cumulative knowledge about the educational projects in which we are all involved: they reveal more about the complex nature of communicative texts and the robust ways in which such texts are changing in our increasingly technological culture; more about how good teaching and learning about written communication can be supported and encouraged within academic settings; more about how authentic written communication tasks can take advantage of a wider range of audiences outside the academy; more about the formation, function, and operation of groups and individuals who choose to collaborate in communicative activities; and more about the kinds of social agency that writers, readers, and teachers can exert in their lives as literate citizens.

To understand these contributions, however, it is necessary to recapture a bit of history. Before we can claim some understanding of how we have come to this important current point of intersection—and where we want to go from here—we need the context and perspective gained only by looking at those efforts that have preceded our own.

Twenty years ago, as college faculty were just beginning to use computers to support instruction in writing and as a group of individuals at Michigan Tech were just developing one of the first WAC programs, faculty across the country were generally skeptical about—and often openly resistant to—recognizing the value of both technologies: WAC as a technology of teaching that could support disciplinary learning and computers as a technology of communication that could support the teaching of writing.

Pioneers like Art Young, who during the late '70s and early '80s was helping colleagues implement WAC programs in a variety of departments and on a number of college campuses across the country, faced faculty in mathematics, biological sciences, forestry, engineering, and physics who considered writing the purview of lower-division English courses. These faculty frequently understood writing as a set of skills to be mastered by students in the first few years of college so that they could then progress to the study of much more difficult content matter. Few faculty during that period connected the writing that they were asking students to do on essay tests, in lab reports, and in final design projects with the specialized processes of analysis and problem solving that constituted professional knowledge within their own discipline. Rather, most teachers understood writing as a way for students to display information learned in class or through the reading of a textbook, generally for purposes of direct evaluation by a teacher.

And while some of these same faculty were using computers—primarily mainframes—in their teaching in the late '70s, these expensive and relatively fragile machines were generally devoted to the manipulation of numbers, data, and complex algorithms.[1] Computers, which grew out of the military culture during the period between World Wars I and II, were kept in air-conditioned rooms out of sight and reach of both faculty and students. To make use of these machines, users laboriously punched representations of data onto cards, fed them into a card reader, and sometime later received a printout of their job. The computers were tended by a class of technology specialists trained in the relatively new science of computer use. The idea of using such machines as environments for writing or composing was less than realistic for several reasons. First, time on such machines was shared as a precious commodity—the computers were relatively slow in comparison with today's technology. Jobs were, thus, ordered and run by technicians, often on a twenty-four-hour schedule, and few people had the kind of extended and direct access to a mainframe that would make electronic composing possible in any realistic way. Second, although some limited kinds of text composition were possible on these machines, the line editors and formatters that made such input possible were so primitive that they resisted any natural rendition of composing processes. Finally, given the expense of mainframes and the lack of status accorded to the teaching of writing at most institutions, the concept of allocating valuable computer resources to individuals in support of their personal composing efforts was generally unfathomable and seldom attempted.

Changes in both situations, however, were not long in coming. By the early '80s, WAC was well established at Michigan Tech, at Beaver College, and at a number of other schools around the country. Given the consistent efforts of early WAC pioneers, faculty in a variety of disciplines represented at these schools were experimenting with writing not simply as a method for communi-

cating student knowledge to teachers for purposes of evaluation, but also as a medium for disciplinary learning and a technology that supported intellectually challenging problem solving. By 1982, at least two books on WAC had been published— *Writing in the Arts and Sciences* (1981) by Elaine Maimon et al., which described writing-across-the-curriculum practices at Beaver College, and *Language Connections* (1982) by Toby Fulwiler and Art Young, which detailed WAC curricular efforts at Michigan Tech—and a number of articles[2] were available for faculty who wanted ideas about how to integrate writing into their classrooms. Several of these articles, moreover, had been published in the professional journals of disciplines outside of English[3], indicating the growing interest that faculty in other disciplines had in the notion of writing as a way of learning content matter and as a means of practicing problem solving. Increasing emphasis, in all of these pieces, was placed on the processes of composing, the value of writing as a medium for thinking, the effectiveness of writing as a medium that supported and encouraged learning. These changes were hastened, as well, by a number of factors that exerted tendential force in the larger culture of education: among them a series of perceived crises in education caused by what some educators saw as a pattern of declining literacy demonstrated by falling standardized test scores; related concerns about increasingly diverse college populations introduced, in part, by open admissions and, in part, by the baby boom; the recognition that academics needed to address increasingly complex and globally defined problems that denied narrow disciplinary solutions.

Important changes also characterized the use of computers in support of writing efforts. Supported by a computer industry that benefited from both military and space program advances in electronics, the first fully assembled microcomputers came out on the market in 1977–78, and, shortly thereafter, found their way into writing classrooms. The low cost of such machines, which quickly became known as personal computers, their ease of use, and the availability of inexpensive and effective word-processing software that was invented specifically to support the act of writing made these machines valuable from the very beginning as communication environments. The subsequent invention and growth of networking hardware and software, which eventually allowed both the local and global linking of individual machines and, thus, the exchange of written information among individuals, magnified this effect. Computer-supported writing and communication environments supported a process-based approach to composition through the production of multiple drafts; cut-and-paste revisions; and invention, outlining, and spell-checking packages. Networks would eventually support peer-group exchanges of drafts, online discussions of rhetorical decision making, and Web-based research, among many other WAC-related approaches.

In the early '80s, therefore, the convergence of the two technologies—that of WAC as a technology supporting teaching and learning of content matter in a

variety of disciplines and that of computers as a technology supporting the teaching of writing in a variety of contexts—was not difficult to understand or predict. But it also did not come about without a series of pedagogical challenges. What surprised some teachers of writing, especially those who had already fought the early battles associated with writing across the curriculum, was the strange version of professional amnesia that often seemed to accompany the use of computers as writing environments during the early 1980s. Even experienced faculty who had already come to terms with some of the important premises of WAC—the value of writing as a medium for thinking and learning, and the recognition that the processes involved in writing were as valuable in many cases as the end product, for instance—seemed prone, in those early years, to want to use computers to address surface-level correctness rather than to encourage writing as a way of thinking.

During this period, many teachers and departments invested a great deal of money on drill-and-practice tutorials designed to eliminate such perennial problems as agreement errors, dangling modifiers, and comma splices; on the grammar-checking software, which often exhibited a 20 percent error rate and which never provided rhetorically specific advice for writers; and on paper-grading and response packages which allowed teachers to incorporate canned commentary on surface-level mechanical problems on students' papers. And although these packages sold well in the early '80s and were prominently featured in many computer-supported writing facilities across the country well into the '90s, they failed to produce consistent results in terms of student writing. There was no consistent evidence that they functioned to improve the quality of student writing over time, and teachers in a range of disciplines ultimately came to recognize this fact.

Ultimately, the same lessons about writing that had provided the intellectual foundations for WAC—the focus on writing as a process of thinking and learning that was refined over time and through multiple drafts, on the wide range of skills and strategies required of writers, on the socially-constructed nature of writing as a medium of both thinking and communication—also came to inform faculty members' understanding that computers had much greater and wider-ranging potential as open-ended and flexible writing environments than they did as mechanical tutorial devices.

It was thus that the stage was set for a series of important sea changes in computer-supported writing pedagogies—and these began to be felt in the early '90s. Teachers who continued to work with computers gradually realized that technology was useful not as a mechanical tutor, but, instead, as a broadly based support system and medium for the writing and learning that students in all disciplines were doing. Pre-packaged tutorials and focused modules of computer-assisted instruction grew dusty on shelves, while students and teachers gravitated toward the more open and flexible composing environments repre-

sented by e-mail, listservs, and, eventually, the Internet and the World Wide Web. Using such environments, WAC faculty in a range of disciplines began to experiment with writing-intensive learning activities: online problem solving in art and publications classes; computer-supported collaboration on business and finance reports; online journaling for math and computer-science students; the exchange of problem-solving approaches and insights across traditional curricular boundaries.

Characterizing each of these innovative applications and each of the chapters that have been included in this important collection is the fact that technology recedes into the background—providing a fertile and flexible environment for writing, thinking, and exchange—while writers, writing processes, and the exchange of information remain in the foreground. The way we think of writing has changed from a set of simple discrete skills that can be accumulated in one or two lower-division English courses to a complex suite of strategies for thinking and learning, strategies that are employed over the full course of students' time in college and in a wide variety of workplace settings. Computers have changed from a technology that supports only the manipulation of numbers to a technology that also supports robust and flexible communication and language environments within which students learn to navigate, associate, create, solve problems, analyze, and identify sources of information.

Another change is also evident. Far from being skeptical about writing as a way of thinking and learning, or about computers as robust and flexible environments for such efforts, faculty in many disciplines are hungry for ideas that will help them exploit the intersection of these two promising technologies. If there is a consistent question I am asked when visiting other institutions to share ideas with faculty about WAC efforts, it is, "How are other teachers using computers to support writing across the curriculum?" How, in other words, can we take advantage of *electronic* communication across the curriculum (ECAC). This book provides a series of case studies that offer responses to this query. And these responses are tested in the crucible of real classroom constraints, by teachers who worry about both the intended and the unintended effects of their instruction; who have too little time and too much disciplinary-specific content to convey to students; and who are responsible for the learning that goes on in math and accounting, in art and marketing, in Western civilization and biology.

Finally, one more word about change. The ECAC contributions described in this volume remind me that change does not stand still—although many of the precepts of good teaching remain more constant. The specific computer applications described in these chapters, you will notice, are for the most part, allocated to the status of end notes—they really matter very little because they are simply time-bound instantiations of a computer world that experiences a new technological generation every eighteen months. Indeed, most of the pedagogical approaches and activities described in this volume could be accomplished

using several different kinds of programs, applications, or tools—or even, in some fashion, without resort to computer-based writing environments. What is important about each of the chapters in this book, then, is not the technology of computers but the ways in which the technology of writing is used to encourage thinking and learning in ECAC environments. For this lesson, and for the many outstanding examples of great teaching that are so generously presented in these pages, I commend this book to the attention of colleagues.

Notes

1. During this period, it should be noted, a few pioneering linguists and literature scholars were also experimenting with the use of mainframe computers to construct such things as concordances, dictionaries, collocations, and indexes, as well as to do machine translations for morphological and syntactic linguistic analyses. For descriptions of such projects, see Susan Hockey's book, *A Guide to Computer Applications in the Humanities* (1980).

2. See, for example, Randall Freisinger's "Cross-Disciplinary Writing Workshops: Theory and Practice" in *College English* 42.2 (1980): 154–66; Toby Fulwiler's "Showing, Not Telling at a Faculty Workshop" in *College English* 43.1 (1981): 55–63; and Randall Freisinger and Bruce Petersen's "Writing Across the Curriculum: A Theoretical Background" in *fForum* 2 (1981): 65–67.

3. See, for example, Cynthia Selfe and Freydoon Arbabi's "Writing to Learn: Engineering Student Journals" (1983) in *Engineering Education* 74.2: 86–90, and R. H. Merritt's "Liberal Studies in Civil Engineering" (1981) in *Civil Engineering* 51.11: 71–73; and D. Stine and D. Karzensk's "Priorities for the Business Communication Classroom" (1979) in the *Journal of Business Communication* 16: 15–30.