Drill Pads, Teaching Machines, and Programmed Texts
Origins of Instructional Technology in Writing Centers

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INTRODUCTION

*A*s someone who began teaching writing in Silicon Valley, CA, it seemed inevitable that instructional technology would interweave with my career, whether in the writing center or the classroom. My experiences, however, have made me skeptical about the relationship between writing centers and instructional technology, and this skepticism stems from what I have seen as several persistent and misguided ideas: the belief that "fundamentals" of language must be mastered before moving on to "real" writing tasks; the use of drill-and-practice exercises to teach those fundamentals; and the combination of that drill with higher and higher technology, whether that technology is in the form of a stimulus-response-reinforcement textbook or a beeping, blinking, if not talking, computer.

To many researchers, administrators and teachers, writing instruction and instructional technology—particularly in writing centers—have often seemed to be a perfect match, particularly when that technology was applied to "remediating" students not prepared for college-level writing. From the "laboratory approach" to teaching composition—first discussed at the turn of the century—to crises created by sudden large influxes of under-prepared students, to more modern faith in "scientific" solutions for persistent dilemmas in teaching students to write, American higher education has turned to technology to satisfy long-standing needs. Unlike technological innovations such as synchronous and a-synchronous environments, hypertext writing, and multi-media documents, the technology I present in this chapter did not (and does not) have the potential to fundamentally change the very nature of what it means to teach and learn writing. Instead, the historical practices I describe provided a means for sorting students and transferring responsibility from institutions to individuals, ultimately giving administrators a method to convey the impression that they were doing *something* about making their institutions more democratic, open, and accessible.

The historical analysis that follows is also not merely a quaint episode in our instructional past. In fact, the fundamental beliefs and the use of technology to pursue those beliefs are still with us (indeed, the specific programmed-instruction materials that I will refer to are still being published today). Our writing centers might focus on the writer and not merely the writing, but the lure of technology to offer "easy" solutions to complex problems is powerful. The tutor-less writing center does exist at many of our institutions. This type of center consists of a bank of skills computers administered by bored work-study students where faculty send students "deficient" in "essential skills." It is often a one-time capital budget expense and much more meaningful to some administrators than a more expensive and complicated tutor-staffed writing center. As we rush to embrace the high tech in our writing centers, our history with various technologies provides no small measure of caution. The problems of under-prepared students, crises in "standards," and definable "outcomes" are all persistent. It is easy to crave technological solutions, and in what follows, I hope to show that these solutions are never ideologically neutral, never without a history and an underlying belief in how students learn. This is true for "old" technologies and no less so for current ones.

TECHNOLOGY IN THE "MODERN" UNIVERSITY: THE WRITING LAB APPROACH

In his study of the uses of radio, film, and television in public school classrooms, Larry Cuban (1986) defines instructional technology as "any device available to teachers for use in instructing students in a more efficient and stimulating manner than the sole use of the teacher's voice" (4). For this chapter, I will slightly alter that definition to include not merely devices (e.g., blackboard and chalk, texts, computers), but pedagogical techniques. In other words, when those in higher education found themselves dissatisfied with the inefficiency and tedium of using lecture and recitation to teach writing, they "technologized" pedagogy by turning to the "laboratory method," a precursor of today's writing center (Carino 1995 "Early" 105). As early as 1895, John Franklin Genung of Amherst College claimed that "the best term, perhaps, by which to characterize the way in which the teachers of English at Amherst have met [the] challenges [of teaching composition] is *laboratory work*" (174). The influential Fred Newton Scott of the University of Michigan agreed with Genung's characterization, describing the English laboratory as a place where "the instructor can again meet his students as individuals and can have leisure for deliberate consultation and personal criticism" (180).

Throughout the early part of the 20th century, the writing lab approach was seen by many professionals as a solution to overcome the frustrations and failures of teaching students to write. In 1902, Frances Lewis recommended laboratory techniques for high schools and described the "revolution" in teaching methods: "Classroom work, once entirely recitation from a text-book, is now often on the laboratory plan, with questions to lead the pupil to make his own discoveries and form his own opinions" (15). By 1912, an editorial in *The English Journal* asked,

"Why not give laboratory principles an adequate test, somewhere, for a sufficient time, to determine whether or not students can be trained to do certain things according to the standard of established present usage?" (48).

That final goal, the "standard of established present usage," provides an important theme that recurs throughout these pedagogical debates. For many critics, the laboratory method would provide a superior way to teach grammar and usage. Instead of comprehensive lectures on various aspects of mechanics, students would work through exercises under the one-to-one guidance of their instructor. This type of instruction was the common feature Genung described at Amherst: "Each of these courses is a veritable workshop, wherein, by systemized daily drill, details are mastered one by one" (174). However, as Peter Carino (1995 "Early") has pointed out, drill and practice was not the only model of laboratory instruction. In fact, work in the writing laboratory could often sound quite familiar and "modern," not so much a large room of worksheets and grammar drill, but instead a place where students wrote, responded, and revised. In 1928, E. L. Holcumb described her high school writing lab:

> Here my English students should write, and write for the joy of writing, each in his separate star. Here sometimes they should play word games and letter games and grammar games. Here sometimes they should give debates and make oral reports. Here they should even learn rules. But most important of all, here they should write. They should learn the joy of expression. This should be our workroom, our laboratory. (51)

Exceptions to the laboratory as merely for drill appeared in the literature from such diverse institutions as the University of Minnesota General College (Appel, 1936) and its College of Science, Literature, and the Arts (Grandy, 1936); Ironwood Junior College (Ferster, 1937); George Washington University (Colby, 1940); or the University of Florida (Wise, 1939). In the last institution, the writing laboratory was a two-hour weekly addition to the required freshman composition course and was a place where, in 1934,

> each student writes what he has to write, whether that be a letter to be mailed, a book report, an assignment from another course, or something of a creative nature. Whatever the case, the instructor is present to serve as a guide, a counselor, or a helper to enable the student to overcome his weakness, let the weakness be one of ignorance of elementary fundamentals or one of style. (456)

By the late 1920s and 1930s, however, those proposing these teaching methods in the laboratory came up against a powerful force. During this time, higher education enrollments increased greatly, tripling between 1910 and 1930 (Willey, 1937), as the children of the great immigrant waves of the turn of the century began graduating high school and pursuing college degrees. This influx of students with varied preparation presented a crisis of sorts. As one commentator noted in 1930: "It is now quite generally admitted by college authorities that deficiencies in

students' previous preparation, especially in such tool subjects as reading, the mechanics of English composition, arithmetic, and spelling, constitute a rather serious handicap to academic success" (Arnold 262). Increasingly, the writing lab became associated with "the mechanics of English composition" and remediating under-prepared students (Carino 1995 "Early"). In H. J. Arnold's (1930) "remedial program" for English composition, "Self taught practice exercises should constitute an important phase of the work. If such helps are not available, provision should be made immediately for these teaching materials" (267-68).

Many professionals were upset over the "burden" of remediation and increasingly identified the individualized laboratory and drill-and-practice methods as best suited to deal with such students. In 1939 Alvin Fountain surveyed institutions nationwide and found "a writing laboratory for those in need of additional drill" (311) a fairly common practice. In the same year, W. Alan Grove (1939) of Miami University in Ohio described the contents of remedial course and lab work at his institution:

> Taking nothing for granted, but beginning with an explanation of the parts of speech—particularly of their functions—the work proceeds thoroughly but with surprising rapidity through sentence structure, punctuation, and grammar, although perhaps seeming to linger a disproportionate length of time over certain fundamentals, a perfect command of which, however, has proved itself valuable, if not indispensable. (231)

Regardless of whether or not the "perfect command" of fundamentals is desirable, drill and practice was also seen as a way to "individualize" instruction. If one student needed practice with verb forms and another on sentence boundaries, then drill-and-practice exercises could address both students in an efficient manner. As a 1925 *English Journal* editorial asked, "Will the 'individual instruction' movement furnish us the solution of the "difficult but inescapable problem of drill on grammar and mechanics?" (The Place of Individual Instruction" 329). That remarkable paradox—the difficult but inescapable problem"—continued to fuel the use of such pedagogy as writing laboratories flourished.

Ironically, attacks on drill-and-practice techniques are as constant in the literature as are their descriptions and recommendations. For instance, from January 1933 to June 1934, an NCTE Committee on Research studied classroom practices and concluded the following:

> The specific aims of written expression reveal what is, perhaps, an alarming emphasis upon mere technicalities of expression. Results of classroom observation throughout the country indicate a similar preoccupation with grammar and the drill pad, with correspondingly little opportunity for the actual expression of ideas. (719)

By 1947, Porter Perrin, the president of the NCTE, noted that "even though there is a growing body of data that points to the ineffectiveness of the workbook

method in furthering actual communication, workbooks continue to be used at all levels, principally because they are easy for the teacher" (359).[1]

Nevertheless, despite a great deal of evidence that it was ineffective, drill in grammar and usage continued. It was the "appalling" lack of preparedness of the students themselves, some critics argued, that led to the obvious use of drill. As one commentator noted, "If there were any proof needed to support the theory that drill work is necessary to supplement the lack so apparent among students applying for admission to the English Composition classes of our colleges and universities, no-credit classes as found in these colleges would be all-sufficient evidence" (Conkling 50).

The survival powers of "drill-and-practice technologies" is a powerful theme in the history of composition and writing centers. But what accounts for this persistence? Why have drill and practice continually offered (and continue to offer) a "salvation" of sorts to beleaguered composition faculty? Mike Rose (1985) traces the origins of widespread drill and practice to the "efficiency movement" of the 1930s when scientific reasoning and measurement greatly influenced educational decision-making. Rose sees the drill-and-practice approach as powerfully important, not because of its effectiveness, but because of its symbolic power: "[Drill and practice] gives a method—a putatively objective one—to the strong desire of our society to maintain correct language use. It is very American in its seeming efficiency. And it offers a simple, understandable view of complex linguistic problems" (345).

Perhaps another answer to the persistence of these methods can be found in the tension between inclusiveness and exclusiveness that has characterized many institutions of higher education during times of increased enrollments by "nontraditional" students. According to Rose, drill and practice and "scientific solutions" are particularly attractive "in times of crisis: when budgets crunch and accountability looms or, particularly, when 'nontraditional' students flood our institutions" (1985, 345-46). Called upon to serve a democratic function (once a high-school education was not quite enough to ensure success in a competitive job market), higher education accepted this "openness" (sometimes reluctantly[2]) by accepting large numbers of students despite their preparation. However, these students stretched the boundaries of pedagogy and curriculum. In some ways they were under-prepared for college-level writing, but in other ways, they created scrutiny of college-writing practices, scrutiny not particularly well accepted by those in charge. While many of these practices have changed over the years, the intractable drill-and-practice work has remained because it performs two powerful functions: 1) By "individualizing" work in the laboratory, the burden of success and failure is clearly shifted onto students and away from the practices and institutions themselves. 2) With drill-and-practice exercises assigned in a laboratory, classroom teachers can clearly wipe their hands of the "dirty work" of teaching some things that are very difficult to teach and learn. It is much cleaner to turn such matters over to a laboratory (and later a computer), and this practice acts as a powerful sign that we've done something about the "problem."

Thus, remedial writing laboratories and later "clinics" proliferated nationwide, and in the 1940s accounts appeared from such varied institutions as Park College (Campbell, 1942), Iowa State College (Mallam, 1943), the University of North Carolina (Bailey, 1946), and Wayne University ("Composition Clinic at Wayne", 1950). By the 1950s, the large number of World War II veterans enrolled in our nation's colleges and universities simply reinforced prevailing notions that had taken hold in the 1920s and 1930s. As Robert Moore noted in *College English* in 1950: "Writing clinics and writing laboratories are becoming increasingly popular among American universities and colleges as remedial agencies for removing students' deficiencies in composition" (388). Moore made it quite clear that such measures were in the students' best interests, and it was up to students to make best use of them: "With the laboratory, as with the clinic and all other remedial devices, satisfactory results are most readily secured when the student, whatever the means of his coming, is personally convinced of the desirability of improving his writing skill" (392).

Occasionally, a commentator would display some indication that it wasn't merely the students' fault that writing was difficult to teach and learn. For instance, a 1951 Conference on College Composition and Communication workshop recommended that "the writing laboratory should be what the classroom often is not—natural, realistic, and friendly" (18). However, by the late 1950s and early 1960s, a new instructional movement found a perfect match between drill-and-practice grammar instruction, the "individualized" learning of a writing laboratory, and a post-Sputnik faith in high technology. Familiar arguments were brought forth, and many practitioners found yet another reason to perpetuate old—and often discredited—practices. In this era, salvation arrived in the form of "teaching machines," "programmed instruction," and behavioral approaches to learning to write, where good "habits" are essential, and these habits are internalized through repetition and reinforcement.

B. F. SKINNER AND THE HABITS OF GOOD WRITING: THE ASCENDANCY OF TEACHING MACHINES AND PROGRAMMED INSTRUCTION

Few other approaches in the history of writing instruction have had quite the scientific backing as the late 1950s and early 1960s efforts to apply the psychological theories of B. F. Skinner. At a time, once again, when enrollments began to increase and non-mainstream students began to put pressure upon the resources of higher education, a technological solution was found that would "individualize" instruction and, as had been true for earlier remedial efforts, shift responsibility from institutions to individuals. This technology came in various forms—teaching machines, programmed textbooks, and, later, computer-assisted instruction—but all were based on behaviorist principles and the reduction of learning to write to the formation of "correct" habits.

Underlying the behavioral approach are the ideas of stimulus, response, and reinforcement as the essential mechanisms of learning. Skinner applied his work with "lower organisms" to education and surmised that "by arranging appropriate

'contingencies of reinforcement,' specific forms of behavior can be set up and brought under the control of specific classes of stimuli" (Teaching Machines" 140). More specifically for teaching and learning, "a student is 'taught,' in the sense that he is induced to engage in new forms of behavior and in specific forms upon specific occasions" (Teaching Machines" 138). These behaviors are broken down into "small steps of graded difficulty, so that mastery of concepts, understanding, and skills are gradually built up" (Lumsdaine, 1960, 13-14).

Essential to this theory is that "rewards" must be present to reinforce the "acceptable" behaviors and provide motivation (Frye, 1964). Behaviorists saw the students' satisfaction upon choosing the correct answer as an important reward. As one proponent described,

> It is satisfying to the student to know that he has answered a question correctly, to know that he is understanding. We have also learned that the more frequent the rewards the better the student assimilates the material. Ideally, he should be rewarded for answering each question correctly, even each part of each question. Also, it has been proved that more learning takes place when errors are corrected *immediately*. Fortunately, a basic characteristic of teaching machines is immediate-knowledge-of-results." (Frye 23)

Designers of teaching machines and programmed instruction consistently refer to two key arguments to support their ideas: 1) These materials can make instruction more "efficient" by individualizing the curriculum. Fast learners won't be penalized by the slow, and the slow can repeat their tasks without hindering the fast (Skinner, "Teaching Machines" 139). This instruction is in contrast to "group instruction," in which "even under the best of circumstances . . . the rate of presentation may be too slow for the fast student and too fast for the slow student" (Frye 23). 2) In an argument that "naturally" extends such teaching to a writing center, these devices are akin to tutors or are "based fundamentally on Socratic question-and-answer or problem-and-solution methods of teaching" (Lumsdaine 13). In a sense, the argument goes, teaching machines will transcend class/economic limitations and allow *all* students to experience the "functions of a private tutor in recitation and practice, with immediate correction of errors and feedback to the student" (Lumsdaine 6), previously available to only a select few. In fact, for some supporters, programmed instruction represented a "revolutionary device," capable of "freeing" students from the bondage" that was conventional schooling. According to Wilbur Schramm (1964), teaching machines would finally transcend the following evils:

> the waste of human resources where there are no teachers or where people cannot go to school; the waste of time and talent where all students are locked into the same place, and all teachers into the same routine; the tyranny of tradition which permits the study of a certain topic to begin only at a certain age, and expects a student to accomplish only as much as a questionable test of his ability says he can do; and the inadequacy of outmoded and inadequate curricula. (114)

While efforts to construct teaching machines would perhaps not fully succeed until the development of the personal computer[3], behavioral approaches did find an immediate application in the "programmed textbook." These texts are based upon Skinner's notions that "the whole process of becoming competent in any field must be divided into a very large number of very small steps, and reinforcement must be contingent upon the accomplishment of each step" ("The Science of Learning" 108). Translated into book-form, this idea appears as a question requiring a response in a "panel" on one page and the answer in a "panel" in the same position on the next page (Homme and Glaser 103). Of course, the primary difference between machines and texts is the ability for students to "cheat" in the latter and simply look at the correct answer. However, Homme and Glaser (1959) dismiss such concerns because with a well-programmed textbook, if steps are broken down into small enough increments and reinforcement is adequate, students will be correct in their responses (and thus rewarded) and have no incentive to cheat (which is unrewarded).

Importantly, this approach to learning, in its attempts to "individualize" instruction, is firmly at odds with ideas of writing as a social activity. Not only do students proceed "at their own pace," but they learn, essentially, alone. In the behaviorist view, "the teacher manipulates the instructional environment in order to bring appropriate behavior under the guidance of subject-matter stimuli" (Taber et al.,1965, 17). These "stimuli" are found in the text itself, not through the interacting with others (which are stimuli of the bad sort). Lauren Resnick (1963) discusses this dilemma as applied to the elementary-grade classroom:

> In a classroom, . . . the teacher does not automatically control all reinforcers. Children can provide one another with powerful social reinforcement whose effects may conflict with those of the reinforcements provided by the teacher. Self-instruction represents, in part, an attempt to gain a greater degree of control over behavior. Competing sources of stimulation and reinforcement are to some extent eliminated. (445)

Early on, the promise of programmed learning as applied to writing instruction was most obvious in teaching grammar and usage. Drill and practice— essentially an "individual" and socially isolating practice—had yet another "scientific" basis for effectiveness. By using these materials, "the teacher is freed to handle the truly creative teaching, where 'thinking,' 'understanding,' and 'problem solving' are involved" (Resnick 439). The "dirty" but necessary task of assigning practice in fundamentals could now be assigned not just to an "awkward squad" (Noyes) or to a "clinic"; instead, needy students would work with the tutor-text and be fully responsible for their own learning (or lack thereof). While Rose describes behavioral theories as applied to the "drill pad" of the 1930s, his description is no less appropriate for programmed instruction of the 1960s:

> The theoretical underpinning was expressed in terms of "habit formation" and "habit strength," the behaviorist equivalent of learning—the resilience of an "acquired response" being dependent on the power and number of reinforcements.

The logic was neat: specify a desired linguistic behavior as precisely as possible . . . and construct opportunities to practice it. The more practice, the more the linguistic habit will take hold. (344)

One of the earliest applications of programmed learning to grammar-and-usage instruction was Joseph Blumenthal's series of textbooks, *English 2200*, *2600*, and *3200* (the numbers representing the number of "frames" or steps students would work through), first published in 1960 and still in print. In his remarks "to the student" in *English 2600*, Blumenthal echoes the arguments of Skinner et al. to convince the student of the efficacy of his text: "Using a programmed textbook is like having a private teacher who watches you as you work and who sets you back on the track the moment you wander off" (iii). And, ultimately, it was up to the students themselves—it was their responsibility—to make best use of this text. Science had done its part; now it was up to the individual student:

> If you will use *English 2600* in the mature way in which it is designed to be used, you may discover that, working at your own pace, you have achieved a better command of the fundamentals of your language—and in a much shorter time. You may also find that you have developed your ability to think and concentrate in ways that will help you in your other studies. You will have profited from letting science help you with its most recent and exciting discoveries about how people learn. (v)

Blumenthal's and other programmed texts proliferated among composition classrooms in the 1960s as more and more non-mainstream students challenged institutions to accept and provide for them. A 1961 Conference on College Composition and Communication workshop on "Teaching Machines and Programmed Instruction" saw representatives of five major publishing companies in attendance. Additional workshops in 1965 ("Report of the Workshop on Administering the Freshman Course," "Report of the Workshop on New Approaches to Teaching Composition") and 1966 ("Report on the Workshop of Students Needing Remedial Help") suggested programmed instruction as a means of remediating under-prepared students. And a 1966 *College Composition and Communication* editorial suggested, "Students who need special help may be assigned to a 'catch-up' class, given a programmed textbook or some other self-instructional instrument" ("Teaching the Disadvantaged" 38). Other writers looked to programmed learning for dealing with the burgeoning population of ESL students (e.g., Spencer and Holtzman; Hall and Hall).

The language of behavioral psychology was particularly attractive to those English teachers who saw learning to write as the cultivation of "proper" habits. For some supporters, the promise extended beyond merely grammar and usage: "Because it aims at shaping behavior rather than conveying information, 'Programmed Learning' could be applied to the teaching of English composition, which is itself a complex mode of behavior, perhaps less desirable than generosity, but more easily mastered" (Huntley 1962, 7). For others, the challenge was to

reconceive composition as a "set of habits," after which "we teachers of composition can propose a useful goal to our students with humility and promise some hope of achieving it" (Huntley 1965, 137). Supporters of "building-block" approaches struck a bonanza with programmed instruction as one devotee wrote in a 1962 *College English* article: "A machine with the strength to block the advancement of a student incapable of mastering, for example, parallelism could prove the greatest boon to teachers of composition since the invention of the red pencil" (Rothwell 245).

Programmed materials were, as Skinner had noted ("Teaching Machines" 143), akin to a private English tutor. As one writer noted in *PMLA*, "[the teaching machine] works individually with the student, can indeed come into the student's home, guides him in his work, corrects him when he is wrong, prevents him from skipping important points, works almost intimately with him" (Morton 4). Another writer, in discussing her experiences with using teaching machines with Korean veterans, found the "autotutorial" superior to actual tutors. After all, "a mechanical tutor did not embarrass [students] by correcting them in public" (Rowland 92).

And once again, the justification of relieving instructors of the "necessary" but unfortunate task of teaching mechanics was brought forth in defense of programmed learning for the composition classroom:

> Virtually all remedial English at the college level could be handled by automation, with the machine as an impartial judge of a student's ability to move ahead. Teachers, relieved of the executioner's role, could then become counselors rather than taskmasters. Their human talents, at a time when trained talent is scarce, could be salvaged for situations better suited to them than mere drill. (Rothwell 247)

Or, as another commentator wrote, "our students and their mechanical tutors will do their necessary drill work out of our sight—and hearing" (Morton 1960, 6).

Throughout these justifications is the assumption of the necessity for drill-and-practice work, despite decades of evidence of its failure. As enrollments burgeoned, arguments needed to be marshaled that would preserve some sense of the status quo. What had been successful in the past was to appeal to "individualization" and "student responsibility." If students were under-prepared, institutions would give them auto-tutorial methods—validated by "science" and truly "student-centered." If students continued to fail with such materials, well, then it was surely students' own fault if they—through "improper" socialization or inadequate schooling—haven't mastered the "right" language habits. Reducing writing to "a set of behaviors" or good and bad habits such as nail biting and politeness also makes it quite easy to then sort students—usually along socio-economic and ethnic lines—according to whatever linguistic behaviors seem "mastered" by the time they enroll in college. By using teaching machines and programmed texts, teachers could be assured that they had fulfilled their responsibility, and it was up to the students to overcome their past preparation. A grant-funded "experiment" with "automated" instruction at the University of Houston described this "problem":

Generally speaking the students in our remedial sections were deficient in verbal skill. Needless to say, there appeared to be an indifference toward, maybe little understanding of, ideas or cultural values commonly associated with higher education. It would be an understatement to say that teaching such raw recruits has been difficult. (Dorough and Shapiro 1964, 18)

Since programmed texts were designed for "success"—that is, the point was for students to answer the questions correctly, not to add up incorrect responses—institutions were off the hook. As one writer noted with regard to programmed texts, "Failure—in the usual sense—is by definition impossible. Failure to finish the program is alone possible, and this is entirely dependent on the time the student is willing to give to it. Certainly, it is the most 'democratic' form of teaching imaginable" (Morton 3). At last, higher education and English departments had found a way to be inclusive and exclusive at the same time.

As has been true with other technological "innovations" in education, programmed learning, after an initial euphoria, experienced what Larry Cuban (1986) identifies as the stages of, first, "scientific credibility" and then "disappointment" (5). In the former stage, several articles appeared that "tested" programmed learning approaches with traditional" instruction. For instance, Charles Simon found that composition sections using *English 2600* showed "no transfer of the book's instruction to application in writing. Moreover, insofar as the 'better learning' it purported to offer in comparison with the other texts, there was no evidence that it succeeded as well" (19). At the University of Houston, "a programmed course was developed" whose students were compared to those taught by "a traditional lecture method" (Dorough and Shapiro 5). Researchers found that "the lecture and program instruction methods employed were equally effective, on the average" (9) to teach mechanics of language. Unfortunately, when examining performance on actual writing tasks, the authors note that "no really acceptable or reliable means of scoring was ever established and the information will not be reported in this paper" (8).

As was true in Houston and as I will next present with regard to the Comp-Lab project, experimental results often showed no significant differences between groups taught by programmed instruction and those taught by "traditional" methods when it came to learning English fundamentals. Supporters of programmed instruction would declare this a victory, however, since their methods were less expensive and less "burdensome" to the teaching staff. Still, two particular aspects of these studies are troubling: 1) "Traditional" instruction is never quite defined. Certainly lectures on comma and pronoun usage are a waste of time for most students. Comparing any instruction to such techniques is bound to find some difference. 2) The underlying assumption that work on fundamentals is essential and separated from real writing tasks is never challenged. As in the two studies I described above, transfer of "skills" to actual writing is problematic (or impossible to research, so say those at the University of Houston).

By the time a 1966 Conference on College Composition and Communication workshop convened on "Teaching Machines and Programmed Instruction," some dissent could be heard after the initial euphoria. As the recorder concluded, "There was a discernible impression from the statements of several consultants and participants in the workshop that there are no current programmed texts which can be wholeheartedly endorsed for English" (193). It wasn't that participants were rejecting these materials on theoretical grounds; simply, the materials needed to be improved. Implicitly endorsed were the functions of individualization, the shifting of responsibility, the persistence of drill-and-practice methods, and the release of composition teachers from such dirty work. A rarer view was that expressed by a 1968 *College Composition and Communication* editorial on "The Status of Freshman Composition":

> If the approach is not effective, it is understandable that some colleges make such courses as inexpensive and easy as possible, herding large numbers of students into lecture halls or televised classrooms and marching them through the pages of *programmed textbooks* dealing with old-fashioned grammar to the neglect of the intellectual aspects of the composing process. (emphasis mine, 82)

Such voices never really dominated the debate, and by the late 1960s and early 1970s a "new" phenomenon arose as "the writing laboratory approach" recycled itself (after 70 years of reinvention) and proliferated nationwide. For many, writing labs were a "natural" home to programmed learning, truly apart from the classroom and ready to be "technologized" with whatever means available.

PROGRAMMED LEARNING IN THE WRITING CENTER:
THE COMP-LAB APPROACH

By the early 1970s, reports on the use of programmed materials in the writing center began to appear in journals and at conferences. For example, the Community College of Baltimore "stocked the laboratory with a modest number of programmed texts, twenty-five separate titles" (Otterbein 1973, 296). This remedial writing lab, where instructors used referral slips to assign students having particular grammar/usage difficulties, performed important functions for both student and instructor, according to its director: "The student can obtain individualized help in his particular areas of weakness at a rate determined by himself" (Otterbein 298). The instructor, on the other hand, managed to maintain the "proper" level of cleanliness by assigning all vestiges of messy instruction to the writing lab with its programmed texts. As a result, the instructor is "relieved of the often onerous and frustrating task of teaching grammar and mechanics, and thus is freed to devote more time to those areas of composition instruction for which his training and experience have prepared him" (Otterbein 298).

The use of programmed materials in the writing lab was also the subject of primary research. In a study of comparing "auto-tutorial grammar materials" as a

supplement to class instruction with four hours per week of class lecture, Tomlinson (1975) found no significant differences "in student writing proficiency." However, auto-tutorial students had a "more favorable attitude toward remedial composition instruction" (8). Though offered more as an indictment of the lecture mode to teach writing rather than a scrutiny of programmed texts, Tomlinson's study indicates some measure of acceptance of programmed materials for the writing center.

Still, some professionals were more skeptical of programmed learning. For example, Rudolph Almasy reported that programmed texts were rejected by students at the West Virginia University Writing Laboratory, and given the lack of alternative models of instruction, the lab became "a mere proofreading service for desperate students with papers in progress" (400). By 1978, Lil Brannon and Jeanette Harris would target programmed materials for particular scorn in their talk to the College Teachers of English of Texas:

> The material that the student plows through (albeit at his own rate) is neither appropriate to his particular needs nor, in many cases, pertinent to his writing problems. The various mechanized material and programmed texts that are available commercially tend to range from the insultingly elementary and asinine to the unimaginatively complex and repetitious. (2-3)

The authors were particularly incensed by the "anti-tutor" nature of such materials, implicitly contrasting the behaviorist "skills approach" to writing center work with an approach more attuned to helping students shape written discourse amid an array of complex influences. Brannon and Harris recognized the easy allure of programmed materials as writing centers proliferated but stressed that students' learning should be the primary concern. Students should be treated as "responsible adults who are motivated to learn rather than as children who must be enticed by clever, TV-like material or as automatons who can be plugged into a machine or a programmed text. If writing centers are to become a viable, permanent part of university life, academics rather than gimmicks must be our concern" (7).

While writing centers were quickly becoming viable and permanent, despite these cautions programmed learning materials were becoming similarly entrenched. By 1981, Muriel Harris would identify two models of "writing assistance": the "writing lab" and the "writing center." In the former (and Harris identifies the CUNY Comp-Lab approach as the prime example), the emphasis is on "products" and lab work is concerned with "word-form correctness" (2). To achieve this goal, materials used in writing labs include "self-instruction books, cassette tapes, [and] computer-assisted instruction" (2). Harris, while being broadly descriptive for an audience not familiar with such work, also issues a caution: "Amidst all the hardware, modules, progress charts, and sign-in sheets, the student can get lost in the shuffle" (3).

Thus, by the late 1970s and early 1980s, programmed materials seemed an inevitable feature of many writing centers. While they might not have been the

sole means of instruction in some places, the tools of programmed learning constituted an important "technology" in the writing center toolbox. As indicated in "Priorities and Guidelines for the Development of Writing Centers," appearing in Gary Olson's influential *Writing Centers: Theory and Administration*, "The center should obtain a wide variety of equipment such as tape recorders, files, filmstrips, films, and *programmed materials*" (emphasis mine, Cox 83).

The development and relative acceptance of programmed learning led naturally to the question of whether such an approach could be more desirable than a writing center staffed by peer or professional tutors. One of the more visible and well-funded attempts to address this question was the Comp-Lab project of York College of the City University of New York. In a series of articles appearing in the late 1970s and early 1980s (Epes, Kirkpatrick, and Southwell; Kirkpatrick; Southwell), the creators of this project describe their "autotutorial writing laboratory, where students work on their own, not in a one-to-one relationship with a tutor" (Epes, Kirkpatrick, and Southwell 1979, 19). Designed to augment classroom instruction for basic writing students, Comp-Lab consists of weekly modules, focusing on "a single grammatical feature." In the original design, the modules were made up of audiotapes and an accompanying workbook (which are still being published; see Epes and Kirkpatrick; Epes and Southwell). In later versions, the authors took advantage of evolving technology and created computer-assisted modules (Southwell).

To justify their approach, the creators of Comp-Lab present arguments by now familiar. Most importantly, they see the bifurcation between "composition" and "grammar" as an important one to maintain for instructional purposes. For the creators of Comp-Lab, instruction in the classroom has a specific focus on "higher-order concerns," and self instruction in the laboratory is separate, skills-focused and remedial. Additionally, Comp-Lab's creators present their approach as a superior alternative to the tutor-staffed writing center, that ["Comp-Lab] can be more effective in instructional terms" (Kirkpatrick 1981, 15). However, is Kirkpatrick justified when she claims that "results of a formal evaluation of the Comp-Lab Project suggest that heavy emphasis on written correctness, along with extensive structured practice, not only improves students' error rates but also has an even greater impact on the overall quality of their writing" (21)? A close look at that evaluation reveals reasons to question her enthusiasm.

It is important to note that the goals of the class to which Comp-Lab was originally a supplement, English 100, consisted of primarily mechanical, sentence-level criteria. For instance, by the end of the course, students would need to demonstrate "the ability to write at least one paragraph which establishes one specific main idea and develops it" and also demonstrate "control of" a variety of mechanical aspects, including agreement, verb forms, tense consistency, plural and possessive forms, and sentence boundaries (Epes 1988, 22). In other words, the primary aims of the course, whether taught via Comp-Lab or without, were essentially the sentence-level

aims of the Comp-Lab units. And how would the non-experimental or control sections accomplish these goals? We are only told that it was through "traditional methods" (Epes 1979 "Comp-Lab Project: Assessing the Effectiveness"). If we can assume that such methods included class-wide lectures on the particulars of language use, it is not difficult to imagine the results of a comparison.

At any rate, the results do indicate some interesting findings. While Comp-Lab's creators declare superiority over "traditional" approaches and even a tutor-staffed writing center, the comparison of the Comp-Lab students with a control group found that while both groups improved their error rates, the Comp-Lab students outperformed control-group students in "three out of six variables," not surprising considering the focus of their instruction. However, perhaps most important is to examine the transfer to students' actual writing. In the words of the evaluators: "The holistic evaluation, therefore, shows a noticeable gain for both the Experimental and Control Groups. Though the gains were slightly larger for the Experimental Group, the differences in the performance were not dramatic nor statistically significant" (Epes 1980, 92). In other words, differences between groups could have been due to the way scores would have been naturally distributed along a normal curve, not necessarily due to Comp-Lab.

The greatest improvement for Comp-Lab students as compared to control was for those students who *failed* English 100. While the directors see this as suggesting that Comp-Lab has "particular benefits for students whose writing level is low when they enter the course," another explanation might be found from a note contained in the outside evaluator's report: "Perhaps the larger amount of writing done by the Experimental [Comp-Lab] group (some 1,500 words per week as compared to about 300 for the Control group) helped to improve their writing skills" (Epes 1980, 94). In other words, those taught by "traditional methods" were learning to write by composing barely one full page per week, while the Comp-Lab group was writing three times as much. If anything, one wonders how the control students managed to keep pace with the Comp-Lab students, considering their instruction.

The "success" of Comp-Lab then is that it did no worse than traditional" methods, while costing less and using fewer human resources, an attractive option in the face of tight budgets and fiscal restraint. This success, though, would always be quite dependent upon not so much the teaching methods themselves but upon the students, we are told. After all, it is students' responsibility to be motivated and seek "independence." When the creators tested Comp-Lab in a variety of "non-college" settings, including two high schools, a labor union, a training program for temporary workers, and staff development in a psychiatric hospital, "success" was not quite as unequivocal as at CUNY-York. In fact, the variable of success had little to do with the learning materials themselves; instead, success was found at sites where "learners were more experienced in managing their own learning, where they had stronger and more tangible

motives for improving their writing skills, and where institutional commitment and flexibility were more clearly present" (Epes 1983, 3). As seventy years of writing instruction has shown, the shift of responsibility from institutions to individuals (or from learning materials to individuals) is a tried-and-true method of managing under-prepared students. After all, the thinking goes, if they cannot learn with what we give them, then they simply don't belong.

Perhaps the most troubling aspect of Comp-Lab for writing center professionals is not so much claims of success as compared to "traditional" classroom methods or to one-to-one tutoring, but a decidedly anti-tutor attitude. For example, in the project's final evaluation, opinions were solicited from other institutions who were using Comp-Lab. One devotee at the Polytechnic Institute of New York gives the following commentary:

> [The Comp-Lab materials] meet a need that in many places is met by live tutors, but they do so far less expensively and far more reliably. . . . Let me mention some of the drawbacks that [tutors] represent: they need to be trained; they can be absent, or late; they can be wrong in what they tell students; they can become unethically involved in producing a piece of writing; they can become part of an endless variety of complex, and distracting, social relationships with their tutees. All of these problems, to name a few, Comp-Lab bypasses. (Epes 1980, 177)

As an example of isolated and decontextualized approaches to composing, Comp-Lab seems to have few peers. Whether or not it is successful is perhaps less important than what it represents: the responsibility for learning "fundamentals" is up to the students (after all, they've come to college under-prepared for reasons entirely of their own making). What better way to provide learning opportunities than to do it in ways that maintain a comfortable barrier between the pristine classroom teacher and the messy drill-and-practice lab. Even those "complex and distracting" problems of "live tutors" can be avoided at a fraction of the cost.

For the writing center field, Comp-Lab is the culmination of seventy years of development. When, in 1981, Muriel Harris bifurcated writing assistance into two approaches—"the writing lab" and "the writing center," with the former the primary home of programmed learning and drill-and-practice approaches—the question for many writing center professionals was whether the writing lab would die out like a Neanderthalic lineage to be later uncovered by educational anthropologists. However, the power of such approaches to address long-standing dilemmas of access and equity in higher education is far too tempting for many institutions as higher and higher forms of technology are developed.

LESSONS LEARNED?

Recently, a participant asked the readers of the internet discussion list WCenter for advice on "the purchase of remediation software." While the first wave of respondents castigated the writer for being "fifteen-years old" in her educational

objectives, several others braved the turbulent waters and recommended some titles. Programmed materials, now found in computer or book form, continue to be produced. The arguments used to sell those products and the assumptions about learning and teaching imbedded in them are eerily familiar. For instance, one computer-based product, *AllWrite!* from McGraw-Hill, dangles a modifier before its potential users and conjures up a familiar appeal: "Covering basic grammar and usage (with additional tips for ESL students), punctuation, and spelling in context, students can practice at their own pace in a writing center or computer lab. Writing instructors can then use valuable class time to focus on other writing issues." Another program, *SkillsBank* from the SkillsBank Corp., finally makes clear in its promotional materials just what it is that classroom teachers will do with their time once they have turned the onerous task of teaching grammar over to a computer: "SkillsBank can go a long way toward giving your students the individual help they need, freeing you to emphasize other aspects of students' writing such as quality of thought and presentation" (SkillsBank Corp). Whether or not every writing center is stocked with these materials is not as important as the reductive assumptions about learning and teaching writing that such instructional approaches represent, assumptions that are easily allied with the latest in high-tech solutions.

My reading of the technological evolution in the writing center from drill pads to programmed texts to computer-assisted auto-tutorials leads to the following conclusion: until writing assistance is more substantial than symbolic, until responsibility is more equally shared among institutions, instructors, and students, and until inclusiveness commands the resources necessary, our technological future will merely reflect our technological history. MUDs, MOOs, and other innovations might flourish in their own right, offering exciting possibilities for improving writing instruction, but attitudes toward the place of under-prepared students in higher education are substantial forces. Writing centers have always been intertwined with such attitudes, and technology is often the vehicle through which these attitudes are realized. Whether in the form of drill pads, teaching machines, programmed texts, or drill-and-practice software, technology has played a powerful role in writing centers past, primary agents in casting writing centers as "clinics for correction" and "houses of remediation." The lure of technology is seductive for all of us. How else can one explain that in the same journal, one year apart, one writer can claim that at his institution, "the computer lab is being transformed into a writing center where students can work individually on specific programs to remedy their deficiencies and to develop their writing skills" (Stark 1986, 5), while another writer asserts that "self-instruction books, tapes, video and slide programs' too often do little more than give 'first-aid' and 'treat symptoms,' perpetuating the image of a 'lab's' work as remedial, trivial, and expendable" (Waldo 14)?

As the writing center field grows and matures, examining its practices through both systematic and informal research, perhaps such divisions will be mediated. In the meantime, publishers will send us flyers, advertising the latest technological

solution to deal with those difficult problems of teaching "fundamentals" to under-prepared students. Administrators will approve budgets for computer systems and reject funds for hiring additional tutors or increasing tutor salaries. And while we might find ourselves responding to the seductive appeal of technology, instead we need to remind ourselves of what our goals are for student learning and how we believe that learning to be best enabled. Writing center professionals can be a skeptical lot, experienced in carefully reading texts and uncovering hidden agendas; when it comes to our future with technology, that skepticism is perhaps our greatest asset.

NOTES

1.   Nearly 40 years later, George Hillocks would conclude the following from his meta-analysis of over 500 research studies:

> School boards, administrators, and teachers who impose the systematic study of traditional school grammar on their students over lengthy periods of time in the name of teaching writing do them a gross disservice that should not be tolerated by anyone concerned with the effective teaching of good writing. (160)

2.   As an example of the ambivalence some educators held toward the "new" students coming to the nation's campuses in the 1930s, consider the following comment: "Most of the privately endowed institutions make use of their privilege of refusing poor students, many of them taking no more than a third of the applicants. The state-supported institutions are less fortunate" (Fountain 312).

3.   Ironically, Skinner himself showed great skepticism of the computer as a "teaching device," calling them a "fad" in 1968: "A simple, programmed cheat-proof workbook would do what computers do at a fraction of the cost" ("Computers Called 'Fad'" 5).