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Literacy, Technology, and the Underprepared: Notes Toward a Framework for Action¹

I. Portraits

Jackson is 37, a returning student, a one-time cruise cook and a former inmate of San Quentin. Now he does body work on cars in the mornings and takes a course on van painting at night. He spends his afternoons at a community college in hopes of learning to read, write, and do basic math. Jackson sits hunched over, looking out of place at a desk, peering from under his straw Stetson as Peter, his writing teacher, asks the class to remember what was hard about school. Jackson raises his hand and says “Reading.” It is no wonder, for he cannot read or write. He asks a tutor to spell *glad, school, learn, and read*; then he writes the sentence: *I am glad to be in school to learn to read.*

Kuntalee is quick to tell you that she is from South Vietnam, not North. Tiny, weighed down by bushy black hair and violet eyeliner and large metallic blue glasses, she has been in the United States ten years now and is studying furiously for her GED, her high school equivalency certificate. She pulls from a sheaf of rumpled papers the dittos provided by the GED office; they explain what is covered by the tests and how to study for them. She has learned the ins and outs of a litigious system and recites how many points she last received on the test and how many points she needs now to pass. In a later class she reads aloud an essay she has written about her latest encounter with this certification system, reads it haltingly, hampered, it seems, by both her second language and her swelling emotion. She relates how she has failed the GED once again, but resolves to keep working hard and hopes to pass it next time.

Huang speaks Cantonese better than English and has cloudy but pleasant memories of the mainland his parents fled. He is nineteen and has spent two years in this country. When not attending classes, he works at his uncle’s grocery store, manning the register. He is a whiz at math, his instructor reports, but struggles with spoken and written English. Reading is especially hard, but writing he enjoys much more, and he fills pages and pages, often as he sits in the grocery. It helps him learn the language, he reports. One long essay is about a trip to Reno and his first time in a casino. He writes this eight-page account on the bus trip home at 3 a.m.

Ariel is youth and wildness. She returns to reading class after an absence of weeks, making her entrance halfway through the hour, collecting, as she goes, a chorus of welcome and concern. “Where you been?” her classmates inquire. “I been around,” she says, laughing and vibrant and proud. Ariel is the program’s problem child, the one that teachers don’t understand. She writes papers about her boyfriends, who are legion, papers

that seem associational in form, one thought flying freely past the next like so many kites. Her reading is similarly ungoverned: she dips into a text only to leave it again, in favor of following her own thoughts. Accompanying her charming bravado is an educational history that will give you pause: she attended five different high schools her senior year, and she was told to leave them all. Everyone feels that Ariel is on the cusp, that she is teetering, as likely to go one way as the other, to drop out of school or to stay. We hope she can keep close her distant vision of becoming a nurse.

On the one hand, our students have a long way to go and there are serious impediments to their progress. And on the other, the new information technologies seem to sparkle, promising much, to aid development, to make movement possible.

Nora is part revivalist and part priestess, carrying out the rituals of initiating newcomers into the mystery of schooling at the community college, assuring them that all will be well, rhythmically punctuating the teacher's talk with "uh huh's" and "all right's" and "sure 'nough's." Nora will tell you quickly, if you ask her about her writing, that she can't spell too well. And she's right, although the confirmation comes as a shock after you hear her read her papers aloud. She reads with such fluency and expression that you are taken aback when confronted with her invented spellings, her wildly idiosyncratic punctuation, her fractured syntax, and you realize that her oral text is a performance, a wonderful embellishment of what she puts on the page. Nora is a cafeteria worker and looks determinedly, adamantly, toward the day when she can have a real career in food services.

I wish I knew some magic. I'd like there to be an incantation that we could chant, a potion, a ritual, a powerful charm. If there were, if we had such things, we could quickly put them to excellent use. We could arrange our universe—our society, our governance, our schools, our instructional theories—such that Jackson and Ariel, Kuntalee and Nora and Huang, would succeed in school, would learn the literacy skills they believe they need, would go on to play out the satisfactory careers and lives they envision.

I speak of magic and potions and special charms because there seem to be such powerful and pervasive and deeply rooted constraints that operate to hold these students back, extraordinary forces that no ordinary solutions can oppose. Children of minority parents, poor children, children who are somehow outside the social mainstream learn special ways of using language, researchers believe, special ways of relating to one another, of structuring time and place, and these ways are not recognized in our middle class institution of school. The problem lies also, some have long recognized, in the very structure of society itself, which is mirrored by, reproduced in school, and ordains the success of some children but the failure of others. Treading on the heels of this explanation is a related one, that young people resist socialization into docility—and rightly so—but in the process forfeit the learning they need in order to mount any

effective challenge to the system. This resistance can also be viewed as a response to unequal opportunity structures—learning to be literate will probably have small economic impact on one’s life, after all—as well as a rejection of linear cultural assimilation— why learn to be literate if the process cheapens one’s own language and threatens one’s identity? (2)

These are not small problems—in fact, they are hideous ones—and there are no explanations which carry easy solutions. Thus, I find myself wishing for magic and potions and special charms. But the trouble with magic is that it has always belonged to the few, to the priests and the shamans who have used it to divine and to reveal and to control. What is needed is a way to democratize the magic, to give it to the people. What is needed is a way to dispel its smoke and distant illusion, but to share its power.

II. Perils and Promise

In this paper I reflect on the role of technology in a liberatory pedagogy, and I offer some notes toward a framework for using the new information tools in literacy instruction, particularly the teaching of writing. There is a tension in this effort, threaded in and out, a juxtaposition of potential to need and actuality. On the one hand, our students have a long way to go and there are serious impediments to their progress. And on the other, the new information technologies seem to sparkle, promising much to aid development, to make movement possible.

It is fun to read the scores of magazines and newsletters and tabloids now devoted to spreading the gospel of information technologies—home computers, teletext and videotex systems, videocassette recorders, teleconferencing and electronic messaging. There are some marvels to behold, things that seem like magic—small storage devices which hold big sets of pictures, words, and film; all-purpose information managers (is it a floor wax or a dessert topping?) that allow you to access and arrange this information and, marvel of marvels, to do so easily, and that promise to allow things that haven’t been imagined yet: small electronic cards that turn your microcomputer into a videoplayer or then allow you to superimpose graphics over the film; word-processing systems that are “multilingual” and tutors that are “intelligent.”

The language that surrounds the ads and the pictures is most often, and not surprisingly, the language of big business. We read of increasing one’s profit potential, of gaining for one’s company a competitive edge, of simplifying communication and thereby freeing valuable employee time—all this, it is promised, through the magic of a new piece of software or a simple hardware upgrade to the microcomputer you already own. There is another kind of language, though, accompanying some of the articles in the tabloids and magazines and some of the editorials about the latest technologies, a very different language indeed, a language almost apocalyptic in tone. “All this power is not just for a few folks with big money and even bigger computer budgets,” one writer proclaims about the small storage devices with the big power. “Just as the printing press democratized information by allowing it to reach more people, hypermedia promises to democratize

information by giving individuals the tools to convert vast quantities of data into usable knowledge,” exclaims a devotee of the new floor waxes that double as dessert toppings. (3) This is the interesting tension, this is the rub: it is axiomatic that the new information technologies can maintain and improve the status quo; in what ways, I wonder, can they also empower those on the margins, in what ways help to reverse patterns of failure?

My impulse is, quickly, to try to imagine the ways in which the latest technological marvels can be put to fine educational use—to envision state of the art computer labs in community colleges and adult literacy projects and basic writing programs—and students in charge, wielding the programs to access and produce information of value to them. This is a vision dear to me and one to which I will return. However, it is good to be wary, to remind ourselves of the size of the mountain that stands in the way of empowerment through education; to recognize the ways in which technology, while potentially offering powerful new tools for understanding and for every person, simultaneously and of necessity holds hands with a tradition in which such empowerment has not been the agenda. It is good to coast awhile, to tread water and look about for currents that may set one’s course without one’s consent.

Editor’s Note

I have been drawn for some time to a passage out of Philip Roth, from The Ghost Writer, in which the distinguished Lonoff describes what is perhaps a familiar struggle:

I turn sentences around. That’s my life. I write a sentence and then I turn it around. Then I look at it and I turn it around again. Then I have lunch. Then I come back in and write another sentence. Then I read the two sentences over and turn them around. Then I lie down on my sofa and think. Then I get up and throw them out and start from the beginning. And if I knock off this routine for as long as a day, I’m frantic with boredom and a sense of waste.

I am drawn to this passage because it makes of the “composing process” a complex backstage drama. I wonder whether, when we look at writing, when we teach it and when we study it with what is often a filtering lens, we mean, finally, to understand the dignity and the will of this drama. What fascinates teachers and researchers of writing is that this drama is implicit in written text itself—not just in the conflict that is the literature of a Philip Roth, but also in Shaughnessy’s basic writers’ mangled sentences, in Emig’s documentation of twelfth-graders in the throes of composing, in the everyday communications that Heath discovered in the Piedmont Carolinas.

In this issue of The Quarterly we present pieces which in their own way capture the dignified drama of developing writers, gleaned in no small measure from the texts they create. First, Glynda Hull turns our minds to computers and to speculations on ways this wondrous technology may be used to release the drama of learning and writing for high risk students at community colleges. Next, Sharon Flitterman-King retells stories of college freshmen as through the drama of their own written dialogues with text they come

to be readers and critics of literature. And Elizabeth Cooke retells her own struggle not only to write but to become, against the odds of ordinary life, a writer of fiction. We are also pleased to have in this issue an account by Sally Hampton of her Keystone Writing Project and a review by Karen Greenberg of a new book on writing assessment and evaluation. These pieces were all undoubtedly born of their authors turning sentences around, reading them, and turning them around again—a process for which we are always grateful.

M.S.

One way to better understand the role of the new information technologies in literacy instruction today is to take a longer view, to understand the role of technology in general and in past times. From this perspective, technology takes its place in a tradition, in a gallery among other technologies like paper and printing, none of which, I think is clear, can alone enable. The extent to which a technology empowers or disables depends on how it is shaped and how it is distributed and how it is used, outcomes which are governed, in turn, by larger social and structural forces. Richard Ohmann (1985) makes this argument when he locates the development of computer technology within our evolving economic and social system. Guided by a neo-Marxist reading of economic development, he claims that “questions of literacy and technology are inextricable from political questions of domination and equality” (p. 675), and that information technologies will evolve just like other technologies, “shaped within particular social relations, and responsive to the needs of those with the power to direct that evolution” (p. 680).

Given current power relations, Ohmann believes that information technologies will contribute to the de-skilling of labor—the process by which jobs lose their socioeconomic status as equipment unseats human skills. Everett Rogers (1986), communications scholar, would agree, seeing as one impact of the new information technologies the restructuring of class systems in America, with the middle class disappearing and the upper and lower classes becoming disproportionately large. Citing the Matthew effect—”For whosoever hath, to him shall be given, and he shall have more abundance: but whosoever hath not, from him shall be taken away even that he hath” (Matthew, 13:12, The Holy Bible: King James Version)—Rogers expects information gaps to widen. And indeed, he offers a startling example of the gap in California’s Silicon Valley, which possesses an unusually high degree of socioeconomic inequality. On the one end are wealthy entrepreneurs, engineers, and managers who live in million-dollar homes in the Los Altos Hills; and on the other, third world women—Spanish-speaking immigrants from Mexico, refugees from Southeast Asia—who work at low-paying manual jobs in microelectronics firms and go home to their single-parent households in San Jose.

When we begin to consider the use of technology in education, and to dream of its transforming power, we need to be wary that schools will likely reflect the social relations outside them. We can find evidence, for example, that access to and use of the new information technologies will be differential, depending on one’s sex and race and socioeconomic status. Generally, children who are advantaged economically will have more access to computers than will poor children. In a 1982 survey in Northern California, forty-one percent of the children enrolled in an upper-middle-class school said

they had a home computer, whereas less than one percent of those children in a nearby Spanish-speaking, lower-income school reported such access (Rogers, p. 234). When poor children do have access to computers at school, there is evidence that they receive computerized drill and practice, in contrast to wealthier students, who are more likely to have use of computers for so-called “cognitive enrichment” (summarized in Griffin & Cole, 1988). Another inequity is that female students have less involvement with computers than do male students, a gap that holds across social class as well as ethnicity. In one study of California high school students, females had less computer experience than did males for each of four ethnic groups—whites, Asians, blacks, and Hispanics (summarized in Rogers, pp. 176-178; see also Hawkins, 1987).

However, it is good to... recognize the ways in which technology, while potentially offering powerful new tools for understanding and for every person, simultaneously and of necessity holds hands with a tradition in which such empowerment has not been the agenda.

Even when access to computers is equitable, there are powerful constraints at work which influence how successfully the tools are used. In her ethnography of a high school writing class in an urban public school, Andrea Herrmann (1987) found that the word-processing technology did not do much to change the status quo. For the most part, students who were already doing well in school continued to do well; those who were used to getting by, got by again; and students who had done poorly in school previously continued to do poorly. What is more alarming, however, is Herrmann’s belief that the new demands of the class—learning to use the computer, being required to work independently, having to cope in a mixed-tracks classroom—actually widened social class divisions. She concluded that “simply placing computers within the existing structure of classroom and school, even in a classroom of highly motivated students and teacher, is unlikely to promote equal learning opportunities for all” (p.87).

The new information technologies can’t operate under their own volition as empowering or disabling tools. Developed within a socio-historical tradition and shaped by the powers that be, these technologies cannot usefully be viewed as neutral tools, as ready to work for one person as for the next. There are powerful constraints on use and access. However, it does not necessarily follow that we educators can’t raise our voices in an effort to shape the technologies to the ends we desire, or even that we can’t be successful in using those tools in an effort to empower those who are underprepared in literacy skills, particularly if we are alert to the larger societal structures and boundaries that we must press against. Even Ohmann, who looks with jaundiced eye on the promise of computer technology, holds out a caveat: “The technology is malleable,” he says. “It does have liberatory potential. Especially in education, we have something to say about whether that potential is realized” (1985, P. 685). Let us begin to consider, then, how information technologies can promote literacy, in particular writing, as a process for

liberation, being mindful that there is ever present the potential for tools to be used badly, to disable rather than to empower.

III. The Newest Magic

Here is a poem written by Freida, a student in a community college literacy program:

this IS about THANKING god IMALIVE.
thank GOD im ALIVE
THAT the SKY are BLUE
that A new DAY DAWNS
for ME AND FOR you
the the SUN light jlistens
on FIELD and ON tree.
and THE HOUSE wwem sing to HIS mate
AND to ME. THE whole WORLD jlow
WITH a HEAVENLY JLEE!
I there ARE heart ACHES.
a WWORLD full OF STRIFE. BUT THANK GOD
O thank GOD just FOR life!

Freida put this poem on paper first and then typed it at a microcomputer. There is a joy in her creation, shouted by her capital letters, and there was a joy that Freida took from seeing the poem printed—perhaps because she saw her words wearing a new mantle, her thoughts taking on a new authority through the public currency of print, and her composition thereby standing a little more steadily in the long tradition of writing at school.

There are many, many support tools for the writing process: word processors that let a writer revise and edit without scribal drudgery; formatters that take the struggle out of footnoting; graphics packages that let a writer be an artist, too, able to illustrate a paper with drawings or figures or graphs, all in a twinkling; printers that avail of many font types—Helvetica and Roman and Geneva and New York Times—and a variety of font sizes, too, tempting us to think of our texts visually, to rediscover the art of document design. There are desktop publishers, letting us produce books and magazines and papers of beautiful quality with an ease that would make a Caxton gasp. There are outlining programs that offer support for thinking through the structure of a text; notetaking programs that can help one keep track of and organize information; hypertext systems that allow one to compose in “levels,” escaping, its evangelists claim, the linearity of text.
(4)

The educational claims most frequently made about these wonders are that they make the production of text easier in a mechanical sense, and more controversially, that they facilitate the thinking that goes with composing—by freeing up energy normally siphoned away by low level concerns like re-copying, and by offering a kind of

scaffolding to support the writing process. (5) There are more radical claims, however, claims that first seem foreign and strange and then full of hopeful potential. I refer here to the hypertext and hypermedia systems that will permanently alter, people say, the nature of documents and the nature of composition such that “writing an essay” will eventually incorporate not only text, but graphics and sound and film. Already there are systems which allow a writer to produce a text that consists of different levels, levels hidden until a reader wants to access them, when they appear momentarily as another window on the screen or as a different screen altogether, and that disappear just as quickly, allowing a reader to go home to the original text. Imagine a film in one of those windows, or an iconic map, or a still picture, and you are beginning to imagine the texts our students will be able to construct in the future.

Don Rothman (1988) has said that “illiteracy in our communities is accompanied by a silence that resembles censorship” (p. 7). I see support tools for writing, the tools newly available through information technologies, the tools that are on the horizon, as tools for finding voices, for being heard. I see these tools as a practical way, a doable means, for underprepared students to become not only consumers of texts as they learn to read but producers as well, using writing in the way that Cummins (1986) talks about, as a means of actively generating their own knowledge, and in the way that Rothman suggests, as a means of social activism which entitles, even obligates, communication.

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Here is an exchange between Pablo, a sixth-grader whose home language is Spanish, and an adult, a university researcher. Although they are separated in space—Pablo in an after-school “juku” and the adult in her office—they are able to converse in real time by typing at computer terminals connected by telephone lines. The genre they use is a written “rap”:

Adult: Hey that’s not nonsense,
that’s no bluff
let’s get on a rap
about serious stuff
There’s a war going on
and there’s no truce
it’s the war against child abuse

Pablo: that/s very sad
and very bad
it makes me very mad
and I hope that we could have
some peace

Adult: yeah—use a gun and go to jail?
huh! hurt a kid and there’s no bail

Pablo: i don/t understand the word bail
could you lead me on the trail?

Adult: no bail?
without money, without greens,
you aint never gonna get out of jail!
that’s what it means
and that’s how it seems

Pablo: so even if you are rich
you don/t have to stay stiff
and can stay out if it if you wish
but if you are poor that/s it?

Adult: if they let you have bail that’s true
so for a child abuser what should we do?

Pablo: stick them stick them rich or poor
leave them in there and close the door

Adult: that’s a rap and you got style
you’ll beat those bad guys by a mile

(Adapted from Griffin & Cole, 1988, p. 226)

In this exchange, Pablo has a chance to converse about a topic of social importance, child abuse. When the adult uses the word *bail*, and Pablo is unsure of its meaning, he asks for clarification through the rap. Peg Griffin and Michael Cole (1988), who report this and other uses of telecommunications, explain how such a written rap might later turn into what they call “compositions”—the portmanteau of *conversation* and *composition*, a genre born when a written rap is revised and edited. And they go on to argue that the use of telecommunications, while not automatically improving children’s writing, nonetheless is an important centerpiece for organizing literacy activities for students from diverse backgrounds. “By not insisting on uniform starting points or uniform roads to progress, and by capitalizing on the unity of joint activity,” they say, “we think we can make progress toward more equitable and successful education” (p. 228).

Information technologies should be tools of access, to people and to ideas. There are many telecommunications programs—electronic messaging systems—that operate locally and nationally and internationally to connect people in disparate places and to allow the exchange of ideas and information. There is electronic mail—messages which travel via networks from computer to computer until they arrive in your mailbox on your computer system. There are teleconferencing systems—conversations via computer screen in which people take turns adding their comments about a topic to a growing text. There are bulletin boards—shared-text systems that post items to be read and written or copied by others.

Writing instruction is already a part of this movement. There is a network that allows teachers from all about the United States, having spent several summer weeks learning about writing instruction, to stay in touch with their newly acquired colleagues. There are networks that connect school children in one part of the country with children in another—Alaskans writing to Virginians, Montanans to Pittsburghers. There are international swappings, too, with students in South Carolina corresponding with their counterparts in Sweden. The belief is that such activities can provide real audiences—people in New York City and Spokane and Tupelo and Kuala Lumpur with whom to converse—and compelling reasons for doing writing in the first place and perhaps as well for being concerned about the clarity of one's text and the persuasiveness of one's ideas and one's language. When electronic communication takes place in real time, as in the earlier examples of Pablo, there is also the opportunity to interact with immediacy, to learn and to teach through written language, and simultaneously to accrue the advantages of having to set out one's thoughts in prose.

In fact, the real power of telecommunications must lie, not just in having an audience to write to, but in the access it can and will provide to information, opinions, advice, data, resources, opportunities, knowledge. It's already possible, for example, to dial up libraries and to query their catalogues for listings of books and journals. It's already possible (though the fees are now prohibitive) to subscribe to abstracting services that offer up-to-the-minute data base searches of newspapers and magazines. And so, I want to see computer labs in community colleges and adult literacy projects and basic writing programs, labs which house not only microcomputers and support tools for writing, but modems, too, for taking the computer's pulse and transmitting it via telephone, for connecting people and information.

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Here is an excerpt from a tutorial in which a writer is working with a computer program called "MINA" to learn to edit her own writing for errors—mistakes in punctuation and grammar and syntax and spelling.

MINA: Your essay contains what I think are 3 comma errors. (Be careful, though, because I sometimes make mistakes in picking out comma errors.) Here are the sentences that I think might contain a "Comma Connector" error. Ask me for help if you don't know what I mean by "Comma Connector" errors.

To teach someone something one has to be patient, understanding, and have an in depth knowledge of the subject.

I like people, and enjoy talking with them.

One must have faith in himself, and then take the risk, because we only get one chance in life.

Sandy: Oh my! Commas! [Looking at the first sentence] Oh, at the end of *understanding*. I guess I don't need it. [Presses the HELP key and reads from the screen]:

“*Comma Connector* errors have to do with commas being misused or not used before connecting words like *and*, *for*, *but*, *so*, and *yet*. To find this kind of error, look for places where you've used a connecting word. If there is a comma before the “and” or other connecting word, (1) check to see if what follows the “and” is a complete sentence. If it is, leave the comma there. If it isn't, (2) check to see if there is a list of three or more things. If so, leave the comma there. If what follows the comma is not a complete sentence or a list, take the comma out.”

Sandy: [thinking aloud] Ok, you need to use a comma before *and* when what follows is a complete sentence. Ok, I don't need the comma in this first sentence after *understanding*, because that's not a complete sentence. I'll take it out. I don't need it after *and*.

[Reading the second sentence and laughing] I do like to shove commas in. Ok, what follows the *and* isn't a complete sentence, so I'll take the comma out.

[Reading the third sentence] I'm going to leave that comma in because I don't know what that's called when you got that stuck in the middle and it's not really essential to the sentence, but you want to use it because I'm able to express myself more fully with that.

(Adapted from Hull & Glaser [in preparation])

Before beginning this tutorial, Sandy seemed to rely on two rules for determining where to put commas. One was that you put commas before conjunctions, and the other, that you put commas whenever you pause. By working with MINA, Sandy began to refine those rules. In the instance given here, she seems to learn that you need to use a comma before *and* when what follows it is a complete sentence. While this rule is accurate enough, it is also reductive, overlooking rules for punctuating lists. In subsequent sessions, Sandy will further refine her comma rule, gaining an awareness that decisions about comma use are influenced by particular aspects of sentence structure. She will also continue to learn how to interact with the computer tutor—in particular, when to overrule a judgment that a sentence is errorful, and how to interpret the “help” that MINA offers. This protocol is one illustration, then, of how a computer tutor can be used to supplement the instruction a writing teacher provides: offering private tutoring outside of class on editing, freeing a teacher to focus on aspects of texts and teaching that computers can't handle or can imitate only woodenly—like responding to the style, order, shape, and inventiveness of a discourse.

A program like MINA was possible because researchers and teachers identified the error patterns that were most characteristic of the writing of a particular population of students, and then gave that “knowledge” about student writing to the computer, along with a pedagogy for teaching students to edit. It represents, I would argue, a big improvement

over those programs that can analyze only surface features of style, like how many words a text contains or how “readable” it is, and over those programs that deal, not with a student’s own writing, but with grammar book exercises taken from the page and transferred to the screen. The best of computer tutors, however, tutors not only for teaching editing, but for teaching invention and argumentation and arrangement, are surely yet to come. There is great interest today in constructing tutors that are in some manner “intelligent”—programs that can be said to know enough about what they are teaching to be able to respond to unanticipated questions, and to know enough about teaching and learning to be able to adapt to a given student’s needs. (7)

Consider, for example, a tutor from another domain, an economics tutor called *Smithtown*, which is a “discovery environment” for learning elementary microeconomics. A part of what this tutor teaches is inquiry skills. In the process of exploring the economics microworld, a student might use an unproductive investigative strategy, like changing many variables at one time. He might, for example, make the price of milk go up, the price of sugar go down, the weather change from dry to wet, and then try to figure out what effect all of these variables had on the price of ice cream. If he persisted in this strategy, the “coach” portion of *Smithtown* would intervene, commenting: “I see that you’re changing several variables at the same time. A better strategy would be to enter a market, see what the data look like before any variables have been changed, then just change one variable while holding all the others constant” (Shute, Glaser, & Raghavan, in press).

I am encouraged by the kinds of activities this computer system allows—collecting and recording data, organizing and interpreting results, testing one’s guesses and refining one’s original assumptions—activities at the heart of much work in the academy—and by the more usual benefits of computers for education, that the instruction the system provides is self-paced, individualized, and interactive. But it is not essential to engage in research on artificial intelligence in order to create stellar tutoring environments. One can also use the new technologies that provide rapid access to film, pictures, graphics, and text to create instruction that far outstrips what has been possible with traditional approaches. I am thinking here of the small holding devices with the big memories—optical discs which promise vast amounts of storage—a couple hundred thousand pages of text on one small device, for example. Given these capabilities, one can give students access to various kinds of texts and devise assignments which call for learning to manage information—to select and organize data, to consider and synthesize many points of view, to compare one’s interpretation of these data to others’ interpretations—skills surely crucial in an information-rich world. One can also give students access, via film and text and graphics, to information on the writing and reading processes. There might be a movie, for example, of an expert writer’s text emerging on the screen, and an interview with that writer about her composing process.

Give our students access to these authoring tools, let them be creators of their own instructional materials, and we can talk about empowerment.

I am suggesting, then, that various kinds of computer tutors can supplement the instruction we provide in classrooms, offering both individualized practice of concepts introduced in class, and exposure to information sources and ways of managing information that go beyond what has been possible in the classroom. These visions seem more palpable when we realize that it is becoming feasible for teachers to create their own software: there are authoring tools so easy to use that they promise to democratize programming. Give our students access to these authoring tools, let them be creators of their own instructional materials, and we can talk about empowerment.

IV. A Manifesto

We asked Ariel to write a summary of a text, a case study entitled “Handling the Difficult Patient.” (8) In this case study, a nurse gives a first-person account of her experiences with a very ornery patient. Here are the first two pages of Ariel’s text. (9) You will notice that her writing is coherent at the start, but begins to derail around line 23, never to right itself:

Page 1

1 The Handling About
2 difficult patient
3 this something telling about
4 a nurse to who won’t to
5 help a patience
6 She was a special night nurse,
7 this man had a stroke and
8 was paral paralysis on his
9 left side. She Was really
10 doing a lot for the patience
11 She Introduced myself
12 she asked him How was
13 he feeling. remark was,”
14 XXX, can’t you see ‘Im in
15 pain?’” he telling the nurse
16 he was in so much pain.

Page 2

17 he really didn’t won’t

18 to answer her. Before
19 she was ready to give
20 him his I.V. Are anything
21 XXX “you’re killing me,
22 you XXX.”
23 Oh this going to be a great
24 Day I said to myself
25 just thinking alone.
26 I have pride in what
27 I do I am going to get
28 pad no matter what I am
29 still going to collect
30 my money no matter
31 what happen I do Believe
32 and I no that In my mind.
33 My thoughts are similar
34 but deep down.

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35 What was the approach?
36 A Registry nurse
37 was so descriptive.
38 impossible for me to
39 find a replacement....

Part of the seeming incoherence of Ariel’s text falls away when we look at the text she was summarizing. We see that she has dipped into that text at various points, taking away bits and pieces, often verbatim, and setting them down again in her own text in a strange and wonderful juxtaposition. Thus, a passage from the original, “My thoughts were similar. But deep down I really wanted to help him. What was the right approach?” in which the author is reflecting on her contradictory feelings about her patient, gets transmogrified in Ariel’s summary to “My thoughts were similar but deep down. What was the approach?” Ariel explained her unusual quotation style this way: “I have practice from when... I try not to copy...when I get a little bit from there, a teacher’ll know what I’m talking about. It’s just a little summary of that, and [I] put it right in my paper, and then if some parts from there I change a little bit, they know I’m not really that kind of student that would copy. Cause another student would copy.” Thus, one of Ariel’s rules for constructing a summary had to do with the avoidance of plagiarism—an injunction that, somewhere along the line, got a little twisted. This rule is a good reminder of what a powerful grip rigid rules and negative injunctions have on students; it also reminds us of something we heard from Ariel many times— that school had been mainly punitive for her.

Another of Ariel’s rules for constructing summaries had to do with privileging those propositions which she saw as relating to herself. While some of the details she selected

to include in her summary contained its gist, she tended to choose details, not because they were important to the original text, but because they interested her. She notes that she changed whole sentences around, not only to avoid copying, but because “the parts about the nurse are something about me...you see, ‘I have pride.’ You see, I can read that for me.” Texts sometimes don’t appear to have a coherent identity apart from Ariel as a reader; the importance of a text tends to be in direct relation to its importance to her—which perhaps can be read as an interesting assertion of self-worth in relation to school tasks which too often had left her feeling not worth too much. In an essay on “what was hard about staying in school,” Ariel recalled a reading teacher who stopped the reading rounds *in medias res* to lecture her about her absences and tardiness. When Ariel’s turn came, she chose not to read.

When we look at Ariel’s text and consider the strikes against her, the constraints that hold her back, there is the danger of being overwhelmed, of wanting to call upon charms and incantations and to hope for special magic. But fearing it impossible to work with people where they are, pronouncing it futile to help them move a distance toward a distant goal, will surely paralyze us all, leaving us to sit, to borrow from Auden, lonely with our separate hands folded on our separate knees. There are other alternatives. Attending carefully to Ariel’s summary, to her reading and writing processes, to her memories of previous schooling, can repay us manyfold, giving us ways to understand her difficulties, to see in them a coherent system that, once charted, can guide a pedagogy and the use of technology within that pedagogy. Indeed, the problems in Ariel’s text—her idiosyncratic selection strategy, for example—have a history and a logic; it’s our job to construct that history, our reward to appreciate that logic.

We of course need not hesitate to look for ways to ease our students’ entrance into the world of texts and information and technologies. Let us find ways to give Ariel much practice with reading and writing, with consuming and producing texts of value to her, with having readers who are engaged—her own classmates surely, but also readers from afar. Let us find ways to introduce her to academic genres like summary writing and to help her revise her buggy rules about discourse production—by giving her access to writing by other students, for example, and to simulations of how more expert writers compose. Let us arrange the classroom in such a way that Ariel can collaborate, juxtaposing her own problem solutions to those that other students offer, and thereby deepening what everyone can know. Let us find ways for her to have access to that vast prairie of information outside the classroom and to learn to order, shape, and interpret it. Let us find ways to encourage Ariel to invent her own discourse genres, to represent thought in ways that we, perhaps, have not imagined, and to legitimate them. And if information technologies employed in these contexts can empower our attempts to empower, let us use them.

Ohmann (1985) would argue that the reason a person has for becoming literate—whatever it is of value that this process appears to offer—is much more important than the particular method of instruction or tools that serve as its vehicle. Fancy tools—printers and laser fonts and videos and modems and screens with multiple windows and small storage devices with big memories—won’t matter a jot if students don’t have good

reasons for writing and reading in the first place, if the context within which these activities occur doesn't promote what Cummins (1986) has called a "redefinition of roles." I am arguing, then, that **we need to embed technology within a liberatory pedagogy**. The tools are put to use in a context; we must shape that context even as we shape the tools.

Given such a curriculum, **we must work for access**, doing what we can to see that campus and state computing funds and gifts from computer companies go partly toward the purchase of machines and programs for our students. Ariel does not have a computer at home, nor access to one in her community. We need to argue, and argue persuasively, that our programs, rather than being the last to benefit from technology, ought to be the first. Our students have further to go and more to learn; but there are other reasons for making them the focus of our work with information technologies. Students who harbor misconceptions or "buggy" rules, who have alternative notions of texts and their purposes and functions, have much to teach us. In understanding the logic and history of their choices and strategies, we can often lay bare principles of learning that are hidden or internalized in processes of experts or more accomplished students, and thereby aid our teaching and guide our construction of computer tools.

Having acquired the tools, we must provide support for learning to use them, support for teachers and for students. Freida, whose poem you read above, required an entire hour to type it at the microcomputer, and the result of her labor, with its typos and ragged margins and false starts, is testimony to her skirmish with the keyboard. I know that it is common wisdom that two-fingered typists are finally just as adept as conventionally trained keyboarders, and that this observation is sometimes used as the rationale for not making formal typing instruction a part of orientation to the computer. But there is a point at which a truism becomes a falsehood. If Freida is to use computer technology to make her voice heard by others, she will need to become much more facile at keyboarding. If she is to be able to take advantage of the myriad tools that might be helpful to her—outliners and note-takers and hypertext systems—she will also need to learn more about a computer's potential.

Across the board, there haven't been many efforts to integrate computers and software into the writing curriculum. Students are simply given access to a word-processing program or to a text analysis program, but they aren't given the support necessary to learn to compose using word-processors or to interpret critically the feedback a text analysis program can offer or to understand the potential and limits of support tools like note-takers and outlining aides. While it is becoming more and more commonplace for departments and programs to purchase software for writing and to make it available to students, to staff computer labs where students can come to work on their writing, it is rare for time to be spent on understanding precisely how to integrate technology, to integrate it well, into a writing course. Such integration requires a great deal more than simply putting hardware and software in front of students. It requires working with faculty to determine how technology can benefit their curriculum, and it requires working with students to determine how to introduce technology so that it aids the writing process instead of providing one more cognitive hurdle, one more time-waster.

I have seen students in microcomputer labs erase whole texts in order to correct a spelling error at the top of the screen because they did not know about cursor movement and other text editing capabilities. I have seen others flinch in dismay when, working slowly through a tutorial on how to use a computer, they didn't have time to decipher arcane language about disk drives and operating systems before the screen changed. I have watched others spend their time at the computer copying from books or articles or encyclopedias, reproducing on the screen what others have put on the page. I have observed inexperienced writers labor over a simple editing change, spending as much time changing *the* to *but* as you would expect should take to type a whole paper.

The truth is, we don't know a great deal about how to introduce students to the new information technologies, particularly when those students are underprepared. We don't know which novice behaviors to encourage and which to ignore and which to struggle against. Perhaps, for example, copying from others' texts is initially a good strategy for those who are novices at both word-processing and writing. Bertram Bruce (1986) and others (e.g., Freedman & colleagues, 1987) have argued that **we need research to determine the kinds of support that students and teachers require in order to be successful at using technology.** We also need to learn how the social organization of classrooms will change when computers are introduced, how expertise in using these technologies develops, and what negative effects of introducing the new technologies to expect. But we must look, in addition, from another perspective: **we need to use research to learn how we can develop technology in such a way that it benefits underprepared students.** The research in this case would not assume that current technology is a given and that what we need to do is to learn how to help students adapt to it. Rather, it would ask, what implicit theories of learning are present in current tools, what representations of the ways that people read and write and use information technologies? And if these representations don't empower, how can we change them? What functional and dysfunctional strategies do students bring to reading and writing tasks? Given our understanding of these strategies, what would an ideal writing environment look like for Freida, for Nora, for Kuntalee, for Ariel?

V. Coda

Ariel went out of town over Christmas break and, a semester later, has not yet returned to the community college program. Kuntalee still attends and continues to work toward passing the GED. Huang now takes classes in an ESL project; he thinks that curriculum too easy and is flying high. Jackson dropped out after a few weeks. Nora was promoted to the next level of the program, and there she presides.

In what ways can we form a malleable technology, how prepare it, how offer it, such that its liberatory potential is loosed and directed for students like Nora and Huang, Ariel and Kuntalee and Jackson? On the one hand, there are these, our students, with much to learn and far to go. On the other hand, there is our social structure and the template of tradition, which inveigh against change. And then there are the new technologies, tools that have

the potential to be reactive, to serve as catalysts and thereby to transcend their expected role. I don't want to underestimate the enormity of the problems facing many students who are attempting to acquire literacy skills, and I don't want to put forth technology as a Pollyanna solution (or literacy either, for that matter). However, I know which of two alternatives I prefer, and it is not watching the information gap widen. Let us consider how we can attempt to form a malleable technology, to prepare it and offer it in ways that loose and direct its liberatory potential.

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Notes

1. In writing this paper, I benefited from discussions with many good colleagues. I wish especially to thank Peter Simon, Brian Reilly, Mike Rose, Smokey Wilson, and Gloria Zarabozo.
2. For discussions of these and other social constraints on the acquisition of literacy, see Heath (1983), Erickson (1984), and Ogbu (1988).
3. For an interesting discussion of why computer technology can be viewed in contradictory ways, see Olson (1987).
4. See Pea and Kurland (1987) for a description of the new technologies for writing.
5. Such claims are, no doubt, oversimplifications; we are only beginning to figure out the extent to which, and the conditions under which, they are true. See, for example, research by Haas (1987).
6. For a description of an interesting new computer tutor for helping writers interpret their assignments, see Parlett (1987).
7. See, for a discussion of this enterprise, O'Shea and Self (1983), and Wenger (1987).
8. The data presented here are part of a larger study conducted by Glynda Hull and Mike Rose—"The Other Side of Excellence: Literacy, Underpreparation and the Cognition of Composing." This research is supported by the National Academy of Education and by the James S. McDonnell Foundation's Program in Cognitive Studies for Educational Practice.
9. I have typed and line-numbered the text, but held true to Ariel's line divisions. Her truncated lines resulted from our asking her to write with a broad felt-tipped pen with an eye toward legibility.

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COMPUTER GRANT

The South Coast Writing Project (SCWriP) has received a \$50,000 equipment donation from Apple Computer, Inc., to help support an Advanced Institute for Computer-Using Fellows. The focus of the institute is on computer-based multimedia applications for teachers of ESL/LEP students. Its purpose is to provide training for teachers of underserved student populations, using SCWriP Computer-Using Fellows who are already active as inservice trainers at local, statewide, and national levels.

Project participants will be providing inservice training, developing applications, conducting research, and publishing their efforts. For further information, contact Stephen Marcus in the SCWriP office, Graduate School of Education, University of California, Santa Barbara, CA 93106 (805-961-4422).