*The structures and functions of writing have evolved in profound ways over the past several millennia. In the process, linkages between spoken and written language continue to change. This study explores symbiotic relationships between writing and cognition, social transformations, theories of pedagogy and technology, and hazards several projections about future developments of the written word.*

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*Visible Language* 31:1
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# thinking, learning, and the written word

The year is around 1150, and Robin (of Sherwood Forest fame) has returned to England after years in the Crusades. Much has changed in his absence, not the least of which is that Maid Marian has become a nun. Middle-aged, confused, and stung by his woman's seeming abandonment, Robin asks how she could have taken vows. Marian patiently explains she had no way of knowing Robin was even still alive:

*"You didn't write," she chides.*
*Robin's innocent retort: "I never learned how."*

A REVIEW ARTICLE

David R. Olson. 1994. *The World on Paper: The Conceptual and Cognitive Implications of Writing and Reading*. Cambridge: Cambridge University Press. 318pp.

Nicholas Negroponte. 1995. *Being Digital*. New York: Alfred Knopf. 243pp.

In this imagined sequel to the familiar saga, the film *Robin and Marian* starkly captures the great communicative divide between medieval and modern times in European-based cultures. Marian presupposes a twentieth century view of the written word ("Drop a line to let me know how you're getting on"). Robin, very much a product of his times, makes no apology for not being literate. And apologize he shouldn't, for literacy in the middle ages was extremely restricted in its participants and functions. Your average warrior or nobleman had no more use for reading or writing than for eating with silverware or regular bathing.

Writing has a history. But an understanding of that history involves more than simply tracing the emergence of scripts in Sumeria or China, Egypt or Mesoamerica. The history of writing is also a history of social change: Why does writing emerge in the first place? What range of functions does it come to have? Who becomes skilled in reading and/or writing, and why? It is a history of changed models of communication: How much does writing attempt to encode speech? What messages or texts do we divvy up for spoken delivery and which do we reserve for writing? But perhaps most fundamentally, the history of writing is a history of how we think, what we know and how we come to know it.

## ❶ What Does Writing Do To Us?

One of the swiftest ways to earn the opprobrium of academic colleagues in linguistics is to suggest that technologies of language or, more broadly, of communication, mold our thinking. Since the presumed implication is that people without these technologies have "different" (read: "less sophisticated") mental make-ups, such a thesis is promptly judged to smack of value judgment and claims to cultural superiority, and to re-introduce long-discarded notions of primitive languages and primitive thought.

Yet in the last half century, a spectrum of writers have claimed transformative virtues for written language or for the technologies by which language is carried. Such virtues have been posited for everything from literacy itself to the alphabet, from the printing press to mass media, from styles of reading to cyberspace. Are these theories just so much contemporary Western handwaving, or do they point to useful ways of understanding the relationship between language (and language modalities) and thought?

In this essay, we will review these claims about the influence of writing (or of media, more generally) on thinking patterns of individuals and of societies. We will see, in turn, that such claims are inextricably linked to educational presuppositions and practices through which knowledge is presumed to change.

### The Literacy Effect

> *"Writing is a technology that restructures thought."*
> Ong, 1992

The most sweeping of the literacy hypotheses is that the very act of being able to produce (write) and/or comprehend (read) durable linguistic representation transforms who we are as individuals and as societies. The strongest version of the hypothesis, which has come to be known as the "great divide" theory, suggests that non-literate and literate people really think differently. A somewhat weaker version, the "continuity" theory, sees the distance between orality and literacy as one of degree (Street 1988).

What is the magical ingredient that literacy is said to bestow? It has been called many things: "logical thought," "rationality,"





even "civilization" (although perhaps tautologously, since traditional discussions of civilization link particular patterns of social organization to the historical rise of cities, which, in turn, generally coincided with the emergence of written language). How is writing presumed to carry off this transformation? In the words of Walter Ong: "By distancing thought, alienating it, from its original habitat in sounded words [i.e., speech], writing raises consciousness." (Ong, 1992:301-302) That is, by being able to look at a representation of what you are thinking about, you can analyze, critique and revise it.

Arguments about the effects of writing on thought have been developed in two ways. The first, epitomized by the work of Eric Havelock, suggests that the availability of a writing system of a particular sort enables a whole society to think differently (in his argument, the creation of the Greek alphabet made possible Greek philosophical thought). We will return to Havelock's thesis shortly.

The second form of the argument has focused on the individual: Through the act of learning to read (and perhaps write), the individual's mental world changes. The particular script doesn't matter — any systematic durable representation of language, be it Chinese or Arabic, will presumably yield similar effects. These effects should be measurable by individual psychological tests, not by looking for major conceptual changes within the society at large.

Initial studies (e.g., Greenfield and Bruner, 1966; Greenfield, 1972) seemed to indicate that literacy fosters cognitive development. Children who could read did better on standard tests of cognitive growth (e.g., Piagetian concept formation and water conservation tasks) than did their non-literate counterparts. However, it was not clear whether the measurable cognitive advantages reflected literacy skills themselves or the schooling process through which children normally become literate (Greenfield, 1972). The analytical advantage that one associates with learning to read and write accrues (so it came to be argued) not from literacy but from the pedagogical process. It seemed impossible to separate the variables.

But what if you could find a community in which writing was not school based? Then you might get a true test of the theory. Sylvia Scribner and Michael Cole (1981) did locate such a group: the Vai of Liberia, who had developed an indigenous writing system, not supported by the schools, that is used for writing letters. In the process, Scribner and Cole offered the most thorough empirical examination of whether literacy or schooling is the critical factor.

Scribner and Cole overwhelmingly found that schooling rather than literacy by itself is the primary source of cognitive molding: "non-school literacies practiced among the Vai do not have the same cognitive effects as Western-type schooling" (Scribner and Cole, 1981:134). However, their investigations did reveal a handful of tasks on which the literate but non-schooled Vai outperformed their non-literate (and obviously non-schooled) counterparts. Among them were explaining to a novice the rules for playing a game, reading an invented rebus script, answering questions about sentences that were read aloud syllable-by-syllable as opposed to word-by-word, and explaining why certain sentences were ungrammatical. In each case, the literate Vai's superior performance builds upon specific skills relevant to the acquisition and/or use of indigenous literacy in the Vai community (e.g., Vai is written with a syllabic script; those literate in Vai often engage in discussion about what constitutes "good" writing).

The literate Vai's advantages, where they appeared, seem to reflect the development (albeit restricted) of metalinguistic skills, that is, the ability to use language to reflect on, talk about, even play with language. Children everywhere develop rudimentary metalinguistic skills — knowing that two words rhyme (though young children may not know the word 'rhyme'); recognizing that a sentence "sounds funny" (that it is ungrammatical — though they may not be able to tell you why); knowing that two words or sentences mean the same thing (though, again, they may not know the words 'synonym' or 'paraphrase'). But do some people develop more metalinguistic abilities than others? Even more to the point, why do metalinguistic skills matter?

One group of language learners who tends to develop particularly acute metalinguistic skills is bilinguals. A growing body of research shows that in comparison with monolinguals, bilinguals are generally better at early word-referent distinctions, more sensitive to language structure and detail, better at detecting ambiguities and analyzing tautological sentences, better at correcting ungrammatical sentences and better at noticing language mixing (see Diaz and Klinger, 1991:173).





But the advantages of bilingualism go beyond language analysis. Investigators also speak of bilingual children as having more "cognitive flexibility" than their monolingual counterparts, noting that bilinguals excel on a variety of both verbal and non-verbal cognitive tasks (see Hakuta and Diaz, 1985 for a review of the literature). Why "cognitive flexibility"? Because by virtue of their linguistic experiences in encountering the world through more than one lens, bilinguals (presumably) can apply this same "flexibility" of outlook to cognitive problems more generally.

Besides becoming bilingual, the surest way to increase one's metalinguistic skills seems to be to become literate. In Olson's words:

> Writing takes language for its object and just as language is a device for "fixing" the world in such a way as to make it an object of reflection, so writing "fixes" language in such a way as to make it an object of reflection. ... Reading involves not only reading skills but also metalinguistic skills, how property x of language is represented in writing. Once represented, that property x is available for application to new activities and new tasks. (Olson, 1991:266)

While non-literate bilingual children generally outscore their monolingual counterparts on metalinguistic and cognitive tasks, the discrepancies are even higher for bilinguals who are literate in both languages (see Bialystok, 1991).

Does the greater "cognitive flexibility" of bilinguals result from their heightened metalinguistic skills? If so, does heightening of metalinguistic skills through the development of literacy heighten the "cognitive flexibility" of monolinguals? A growing number of studies (e.g., Herriman, 1986; Torrence and Olson, 1987; Olson and Astington, 1990) argue that literacy itself fosters metalinguistic awareness and cognitive growth. How? According to one model:

> Literacy has its impact on cognition indirectly, through the invention and acquisition of a complex set of concepts [in this model, speech act verbs and mental state verbs], expressed in a metalanguage, for talking about texts. These devices turn linguistically-expressed propositions into objects of thought. (Olson and Astington, 1990:705)

Such are the posited effects of literacy in general. Might there also be consequences of particular forms of literacy?

## The Alphabet Effect

> *"The use of the phonetic alphabet helps to explain why Western and Chinese thinking are so different — abstract and theoretical for the West versus concrete and practical for the East."*
>
> Logan, 1986:21-22

I. J. Gelb (1952/1963) initially suggested that the emergence of alphabetic writing represents a cultural advancement in that the ability to represent each sound of spoken language with a distinct symbol is, so he argues, culturally more sophisticated than using a system representing whole words with symbols (logograms) or clusters of sounds with single symbols (syllabaries). In Gelb's words, the alphabet is "the most developed form of writing" (Gelb, 1963:15). Or as Olson summarizes the alphabetic thesis:

The representation of ideas through pictures, the representation of words through logographic signs, the invention of syllabaries are all seen as failed attempts at or as halting steps towards the invention of the alphabet, it being the most highly evolved in this direction and therefore superior. (Olson, 1994:4)

The theory of the alphabetic mind fully came into its own through the work of the classicist Eric Havelock (e.g., 1963, 1976, 1991). A member of what has sometimes been called the "Toronto School" (including, among others, Marshall McLuhan), Havelock argued that the emergence of Greek philosophical thought can be explained by the development of the Greek alphabet. In a nutshell, the argument goes like this: The Greek alphabet was adapted from the Phoenician alphabet, sometime around 850-800 BC. Like other Semitic languages of the time, Phoenician was written with a consonantal alphabet, which had regular symbols for consonants but not for vowels. By developing symbols to represent Greek vowels (generally co-opting Phoenician letters for sounds not present in Greek), it became possible to record all of the segmental speech stream. Havelock concludes that the availability of a "true" writing system (i.e., one that can represent all sounds in the language) made possible a kind of logical and historical thinking not conceivable without the ability to write out, analyze and critique one's thoughts (see Goody and Watt, 1963 for a summary of Havelock's arguments).

Reaction against Havelock's theory of an "alphabetic mind" has been sharp and continuing. First, the argument about cognitive effect. There seems to be no evidence that the alphabet is in any way a superior representation of language. No one today seriously assumes, for example, that the Chinese or Japanese have less sophisticated (or less abstract or theoretical) "thought" than their occidental alphabetic compatriots. In fact, most of the critiques of Havelock's work (e.g., Lloyd, 1990; Halverson, 1992) have attacked cognitive claims for the "great divide" theory more generally.





Second, there is the linguistic argument. The alphabetic principle of representing individual sounds with signs is hardly unique to the Greeks. Phoneticism has emerged independently in writing systems across the globe (see Coulmas, 1989). While Greek seems to have been the first language seriously to attempt representing all vowels and consonants with individual signs, even that attempt was not complete. As Unger and DeFrancis (1995) have pointed out, the "myth" that alphabets represent all speech while logographic (character) systems only represent words is simply wrong. Every developed character-based system we know of — from Mayan glyphs to Egyptian hieroglyphs or Chinese characters — represents some sounds, and every alphabetic system has mismatches between pronunciation and orthography: to wit, English 'reign', 'pain' and 'mane', which share a common vowel sound but not a common spelling for it. Some alphabetic systems are more closely matched with sounds than others (e.g., Finnish does a better job than English — Unger and DeFrancis, 1995:54), but none achieves a full one-to-one correspondence.

Third, there is the argument concerning levels of literacy in Classical Greece. Some of Havelock's fellow classicists have argued that despite the presence of a "true" alphabet, writing (and literacy) did not play as critical a role in fifth century Athens as Havelock assumes. While the experts themselves are not in full agreement, it appears that much philosophical discourse of the time was oral, not written, and that the levels and uses of literacy among the citizens of Athens were not especially high (see Harris, 1989; Thomas, 1989).

Yet for all the problems with Havelock's thesis, some profound change *did* take place between the Greek dark ages (memorialized in the written versions of the *Iliad* and the *Odyssey*) and the Classical Greek period. Olson charts this transformation — what has sometimes been called the Greek invention of the concept of mind (Snell, 1960) — not through the development of the alphabet (as Havelock would have it) but by coupling a speech act analysis of verbs in Homeric and Classical Greek with Havelock's (and Olson's) more general thesis that writing models speech, and that by making words tangible, we transform them into objects of our consciousness. Olson builds the case as follows:

The Homeric Greeks experienced or represented speaking, thinking, feeling and acting as originating outside the self, typically in the speech of the gods: they "had to" act rather than "decide to" act. The Classical

Greeks came to see speech and action as originating in the mind and progressively under the control of the self. It is this new way of seeing speech and action which allowed for the increased control and responsibility that we speak of as the rise of self-consciousness. The proposed route to this self-consciousness is the experience of writing. Writing provided a model for one's speech. Consciousness of words permits their distinction from the ideas that words express. Writing, therefore, gives rise to the idea of an idea and the mind becomes the storehouse of those ideas. Thus it is at least plausible that the discovery of the mind was part of the legacy of writing. (Olson, 1994:242)

This rise in self-consciousness, facilitated by writing, can be seen as the societal equivalent of the growth of cognitive flexibility that we saw engendered through individual development of meta-linguistic skills.

While Havelock and others have argued that the act of writing transforms our cognition, a different group of players has focused on the effects of the technology through which language (written or spoken) is conveyed. The initial phase of this discussion encompassed the effects of the printing revolution and of electronic media up through the rise of television.

## The Print and Media Effects

> *[According to Marshall McLuhan,] typographic man assumed that A follows B, that people who made things — whether cities, ideas, families or works of art — measured their victories (usually Pyrrhic) over periods of time longer than those sold to the buyers of beer commercials. Graphic man imagines himself living in the enchanted garden of the eternal now. If all the world can be seen simultaneously, and if all mankind's joy and suffering is always and everywhere present ..., nothing necessarily follows from anything else.*
>
> Lapham, 1994:xxiii

The modern scholarly reference point for analyzing the role printing has played in social and intellectual transformation is





Elizabeth Eisenstein's *The Printing Press as an Agent of Change* (1979). In it, Eisenstein, an historian, probes a variety of effects that printing had on early modern Europe: the growth of a lay intelligentsia, the rise of comparative scholarship, movement towards a standard dialect, increases in literacy rates, the appearance of didactic children's books, an increase in translation (especially of French literature), and, perhaps most importantly, creation of a tool for religious upheaval (first with the proliferation of printed indulgences and then publication of Luther's Bible and other "reforming" tracts). While Eisenstein's work may be criticized for not being sufficiently explanatory, it provides the basic source of data from which scholarly and popular discussion of the effects of printing continue to draw.

Literary critic-come-visionary Marshall McLuhan (e.g., 1962; 1964/94) takes the coming of the printing press as but the first of two major revolutions in human thought and social integration: While the print revolution turned us into typographic man, the more recent media revolution (ushered in by the telegraph and the telephone, and followed by radio and television) has transformed us into graphic man. Literacy may be rendering us schizophrenic (McLuhan, 1962:22), *the medium is the message and the global village*, makes for a better world than the isolating model of individuals sitting alone reading in their studies.

Those who lived through the 1960s remember McLuhan's rapid ascension to the status of pop guru. Like a modern Delphic Oracle, McLuhan was known for his flashes of insight — and lack of critical analysis. The problem, as Olson points out, is not that McLuhan had no ideas worth examining, but that he proclaimed rather than explained:

> McLuhan's ... hypotheses regarding oral man, literate man, electronic man and so on continue to be apt metaphors but have limited theoretical use. They fail, I believe, not because they are false but because they do not indicate precisely how writing or printing could actually have produced those effects. (Olson, 1994:37)

Is there an alternative way of conceptualizing the connection between language (particularly writing) and thought? While

hypotheses about the literacy effect and the influence of print and early telecommunications bear grains of truth, the problem has been to explain why the effects arise, particularly in the times and places they do. In attempting to solve the problem, Olson turns the literacy model on its head and looks not so much at the effects of writing but of reading.

## The Reading Effect

> *The failure of earlier theories of the implications of literacy comes from their assumption that literacy has its effects through advances in ways of writing, that is, the form of the script; in contrast I shall argue that conceptual implications arise from the ways of reading, for it is the art of reading which allows a text to be taken as a model for verbal form, that is, for "what is said." These models of what is said, whether as sounds, words or sentences, are always incomplete, giving rise to problems of interpretation. Whereas scripts provide reasonably adequate models of what is said, they provide less adequate models for how what is said is to be taken.*
>
> Olson, 1994:18-19

The most responsible attempt to date to argue for an effect of written language (and of the technologies through which writing is conveyed) on thinking and knowing is David Olson's *The World on Paper*. Olson combines an articulate analysis of previous attempts to assess the relationship between language and thought with novel and forceful arguments of his own. Writing, says Olson, can indeed be shown to affect cognition, but not for the reasons that Ong, Havelock or McLuhan would have us think. Olson focuses his attention on a specific point in time and space — Western Europe from the late middle ages through the early modern period — and on a restricted group of textual genres — legal, religious and scientific writings. Drawing heavily upon the work of others from a range of disciplines (speech act theory, medieval law, the rise of modern science), Olson argues that what changed from about the twelfth or thirteenth century to the seventeenth or eighteenth was not the form of written language or even so much the medium (printing) through which it was conveyed, but the presuppositions that readers brought to interpreting texts.

What were these presuppositions? The first concerned what should be written down in the first place. During the middle ages, writing served largely as an aide de memoire, not as a primary repository of information. Even legal dealings, which today we take as a paradigmatic venue for writing, were primarily oral and only secondarily written. Up until the thirteenth century, the deeding of land was typically an oral ceremony, accompanied by a clump of soil from the deeded property (Clanchy, 1979:36).





And English written wills (as opposed to oral ceremonies supplemented by written documents) did not become legally binding until the seventeenth century (Danet and Bogoch, 1992:98).

A second new presupposition concerned the role of the reader when encountering a text. If the specific content of a text is presumed to have meaning in and of itself (rather than being a shorthand for reminding the reader of the gist of what was said), then it becomes important for readers to derive the meaning that the writer intended. The problem, Olson suggests, is that by its very nature, writing can tell us what is intended but not how the reader should interpret it. In the language of contemporary speech act theory, writing expresses locutionary but not illocutionary force. The modern reader's task is to ascertain the writer's intended illocutionary force.

Taking the Book of God (the Bible) and the Book of Nature (the growth of early modern science) as his major foci, Olson demonstrates how Protestantism introduced a new theory of reading, one in which Luther presumed that the intended meaning of the Bible (both its locutionary and illocutionary force) was transparent, if the text is available to us in a language we know how to read (hence the motivation for translating the Bible into the vernacular). By way of analogy, the Book of Nature was equally discernable, again, if we could only figure out what it said:

To read algorithmically implied that all readers relying on these methods obtain the same reading or interpretation and that they obtain it on every re-reading. The correct interpretation ... allowed a clear distinction between what was in a text and what someone may read into a text. It came to be ... the Protestant way of reading scripture. But once this method of reading scripture was developed it was a rather simple step to assume that nature could be read in the same way. (Olson, 1994:169)

How did the analogy with science develop? Its roots are found in the work of Francis Bacon:

Knowledge, for Bacon, is produced when the mind meets things in [a] special kind of language Bacon referred to as "writing." Writing involves setting the order of expressions with the order of things. The minimal parts of the world correspond in a way to the minimal parts of written language. Bacon, in fact, elaborated this metaphor by talking about the alphabet of the world — the language of creation — which one could learn to read by careful observation and analysis. This language was ... the language in which the natural world was written by the creator. (Olson, 1994:164-165)

Unlike his predecessors, Olson proposes a logically argued, textually supportable theory about how the written word can change the thinking of at least a segment of society in a particular time and place. What Olson offers is not only a theory about reading in early modern Europe, but, perhaps equally importantly, a methodology for approaching questions about the impact of language (and language technology — in this case, of printing) on thought.

While Olson's book ends with some useful insights on the growth of modern psychology, the rise and fall of empiricism and on post modernism, Olson does not deal with communicative technologies after the printing press. Similarly, though McLuhan had much to say (though without Olson's methodological rigor) about the printing press and communicative media, his pronouncements ended with television. Dying in 1981, McLuhan did not experience the computer revolution and, in particular, the emergence of cyberspace. Yet like writing and printing and television, cyberspace as a medium of linguistic exchange is likely to have a profound influence on the way we think and interact.

### The Cyberspace Effect

> *A change is upon us — nothing could be clearer. The printed word is part of a vestigial order that we are moving away from — by choice and by societal compulsion.... This shift is happening throughout our culture, away from the patterns and habits of the printed page and toward a new world distinguished by its reliance on electronic communications.*
>
> Birkerts, 1994:128

How does language conveyed by computers across a network — computer mediated communication — affect what we express, think and know? Although our primary mode of interacting with computers is now written (wide-spread voice recognition and video systems are still in the future), this style of written language is in many ways more akin to everyday speech than to the more formal writing we do when sending letters or memos via "snail mail." Specialists on communication in cyberspace (e.g., Bolter, 1991; Herring, 1996; Hiltz and Turoff, 1993; Jones, 1995) are now analyzing the formal language characteristics of e-mail, computer conferencing, chat rooms and hypertext.

Meanwhile, one of today's foremost media gurus, Nicholas Negroponte, founder and director of the Media Lab at the Massachusetts Institute of Technology, has collected his thoughts on the more general question of how computers are shaping who we are into a book aptly titled *Being Digital*. While not exclusively focused on the effects of cyberspace on language transmission, Negroponte — reminiscent of McLuhan — offers insightful observations and, yes, pronouncements that bear scrutiny.





The transition from McLuhan's mass media to global networking has brought about a number of shifts in the way we think about and use language. Some have even argued (e.g., Fowler, 1994b) that cybernauts are entering a period of what Ong (1982) called secondary orality, that is, a literate culture becoming once again more oral. Like pre-literate man (or woman), says Fowler, producers of electronic texts are no longer seeing their written products as permanent, no longer undergirding all text with logical analysis, no longer fostering a distance between author and reader, and no longer emphasizing individualism over community.

The emergence of cyberspace presages more than just a new medium for swapping messages. If Negroponte, Fowler and others are right, global networking will redefine how we work, how we socialize and how we learn.

Since modern computer technology has largely sprung from institutions of higher learning (and think-tanks that its graduates populate), it is hardly surprising that developers of computer hardware, software and networking have coupled their technological visions with blueprints for new forms of education. In order to understand the potential effects of cyberspace communication on language and thought, we first need to look more closely at the pedagogical traditions from which current computer models of education have sprung. As we will see, these evolving educational traditions themselves make important assumptions about the relationship between reading, writing and learning.

The link between pedagogy, language and technology is the subject of section 2 below. Using what we have learned, we attempt in section 3 to look ahead to literacy and pedagogy in the twenty-first century.

## ❷ Convergences Between Pedagogy and Technology

Just as writing has a history, so, too, do theories of education. In the United States, twentieth century assumptions about education have coalesced with emerging computer technologies to create a model of pedagogy radically different from the one we have known since the development of printing.

Where have these modern assumptions come from?

## Pedagogical Models

> *Aquinas considered neither Socrates nor our Lord committed their teaching to writing because the kind of interplay of minds that is in teaching is not possible by means of writing.*
>
> McLuhan, 1962:23

A comparative history of education reveals two traditional ap-proaches to pedagogy: either on-the-job training from one who already "knows" (the apprenticeship system) or a somewhat more abstracted model in which the "knower" (the teacher) imparts information (e.g., about geography), works on skills training (e.g., addition), introduces texts (e.g., literature) or offers guidance on how to think through problems (e.g., logic), but does so acontextually. This latter acontextual scheme has characterized formal Western education since at least the middle ages. However, both models assume that a teacher (who knows more about the topic than the learner) is essential to the pedagogical process.

In contrast to these teacher-centered (or expert-centered) models is a more contemporary learner-centered perspective: No one can actually teach another person anything; people learn on their own. Teachers are best seen as facilitators who point the learner in useful directions. "Self-made" men and women have always been the product of learner-centered rather than teacher-centered education.

How have language and technology shaped our views of the roles of teachers and learners? At least through the middle ages, teaching was taken to be a spoken, not a written activity. Hence, McLuhan's comment on Aquinas. Olson would probably phrase it somewhat differently, arguing that until the late middle ages or the early modern period, expository writing had not yet developed many of its contemporary representational functions (other than reminding us of what had been said). Only when the written word took on a life of its own — a process greatly facilitated by the printing revolution, which made it economically possible for readers (and learners) to study texts independently — did individual reading become a widespread form of pedagogy, either teacher-directed or student-centered.





For most of modern European history, formal pedagogy has been text-driven and teacher-directed. However, a chain of ideas and events in twentieth century America has been shifting the balance away from teacher-centered and perhaps away from text-based learning as well.

The seeds of learner-centered pedagogy in the United States were sewn in the first half of this century, when John Dewey argued that learning is best done through individual exploration, not through lecturing or memorization. While Dewey's educational theories were more often espoused than implemented, they prepared the ground for an educational reorientation that grew out of three transformations in the 1960s: one based in psychological theory; a second, in education (and the economy); and the third, in politics.

For the first half of the twentieth century, American psychology was dominated by a behaviorist model. Zoological organisms learn, so Watson and Skinner believed, by having their behaviors shaped by others. Explanations of animal (including human) behavior that necessitated positing unobservable mental constructs were eschewed. The behaviorist model naturally implies a strong role for teachers in the educational process to dole out rewards and punishments.

In Europe, a very different model of psychology (though not necessarily of formal education) was being explored. Jean Piaget's theory of genetic epistemology argued that children already contain the germs of knowledge. By interacting with the physical and social environment, this knowledge emerges according to a biologically predetermined schedule. Like packaged mixes to which you just add water, children only need an environmental catalyst to take off. During the 1960s, American psychologists, increasing dissatisfied with behaviorism, began reading and teaching Piaget's work.

The second variable was the explosion of higher education. Funded by America's post-war prosperity and justified in part as a means of training Cold Warriors, higher education expanded several hundred fold. In 1960, barely five percent of high school graduates had completed college. By 1990, the number had

risen beyond twenty percent. Many more held associate degrees or enrolled in college courses.

But what should we be teaching this larger, increasingly diverse group of students? The post-World War II curriculum, grounded in the Western classics, overviews of history and the rudiments of science and mathematics, had been designed for a smaller and culturally more homogeneous clientele. Could we — should we — ask millions of students each year to read the *Iliad* and study the calculus?

The answer came, in large part, from student response to another 60s experience: the Vietnam War. We shouldn't be teaching them much of anything. They could learn more by themselves. And so the era of individually designed majors, group independent study projects and the pass/fail curriculum, introduced at the end of the 1960s, pervaded campuses around the country. Faculty were, at best, facilitators, not sources of "the knowledge."

In sum, by the end of the 1960s in America, the ideological foundations for learner-centered pedagogy supplanting teacher-centered education had been laid. This timing happened to coincide with the burgeoning computer revolution. Although mainframes had not yet begun yielding to minicomputers, and the microcomputer was still a decade away, a number of computer scientists — from Alan Kay (godfather of graphical interfaces, the mouse and the notebook computer) to Seymour Papert were envisioning critical links between computers and education.

## Computing and Pedagogy

> *The essence of education is instruction — something some people do to other people, usually with required "discipline." The word pedagogy comes from a Greek verb meaning "to lead," and education itself is from the Latin word meaning "to lead forth" — both imply the active leader herding a flock of passive followers. But the essence of the coming integrated, universal, multi-media, digital network is discovery — the empowerment of human minds to learn spontaneously, without coercion, both independently and cooperatively. The focus is on learning as an action that is "done by," not "done to," the actor.*
>
> Perelman, 1992:23





The educational philosophies of the late 60s took deep root in the computing world, especially as it was emerging at the MIT. Piaget's work on genetic epistemology undergirds the work of MIT Professor Seymour Papert, inventor of LOGO, on how children can use computers to learn. Countering the late 60s image of computer users as lone hackers working through the night in the bowels of a computing center, Papert saw computers as a way of bringing learners together to create knowledge (e.g., Papert, 1980). What were their teachers good for? Facilitating, of course.

The emergence of cyberspace in the late twentieth century opens the possibility for yet another revolution in pedagogy, driven by a writing-based technology. Much as Luther made it possible (through the art of translation and the power of the press) for all Christians to read the Bible themselves, the Internet is rapidly enabling anyone to have access to any book, monograph or article in the world.

The Internet redefines pedagogy in two important ways. First, it offers a medium that potentially obviates the need for the traditional teacher. Purveyors of information or knowledge post their offerings on the Net (entire courses of study, books, personal musings, local basketball scores), not knowing who their potential "students" may be. End-users can choose what materials they wish to access, when to view them, what to print out and whether to click to another site when boredom sets in. Learning is in the eyes (and hands) of the beholder.

Second, the medium is written, but different from writing in the age of printing (from Gutenberg's press to the early 1990s). Unlike printed texts that are archived in libraries or can be purchased in bookstores, Internet text is more ephemeral. It is problematic to cite in a bibliography something pulled off the Net, since the item may be gone by the time a reader goes looking for it. Moreover, as we will see, the relationship between author and reader is potentially as transformed (and as transformative) as the relationship between reader and text that emerged roughly five hundred years ago.

What are the educational implications of this new learner-centered, structurally ephemeral computer mediated communication engine? In the next section, we will try to find out.

## ❸ Writing, Learning and Knowing in the Twenty-First Century

If attempts to explain conceptual change in the past (such as the impact of literacy on thought) are often conjectural at best, second-guessing the future is riskier still. Yet such a gedanken experiment is appropriate in light of the profound and pervasive impact that computers seem poised to have upon our social lives as language users and as learners.

What will this future be like? Assuming for the moment that Negroponte and his compatriots are right in their predictions, the new technologies appear to be leading us in several directions that are at odds with the legacies of writing described by Olson. Before we can judge whether such changes will be for good or for ill, let us be clear about what these legacies are.

## Legacies of Writing

> *It is the representation of language by means of visible marks that, at least in Western culture, turns language into an object of thought and analysis.*
>
> Olson, 1991:267

In retrospect, we can reasonably credit literacy (and the pedagogical process through which it has generally been conveyed) with bringing about three transformations in the West: our notions of individualism, our ability to be linguistically self-reflective and our assumptions about interpretation.

As we said earlier, Snell and others argue that the distinct concept of mind (internal thoughts and feelings, separate from action) only arose roughly 2500 years ago in Greece, coterminous with (and, Olson posits, perhaps aided by) the rise of Greek literacy. This notion of mind, it is claimed, underlies, in turn, the Western concept of the individual. While the modern Western notion, Olson argues, is honed by events particular to Europe (including the decline of feudalism, and the rise of capitalism and of democratic organizations — Olson, 1994:25), Western individualism is also, as in early Greece, the product of literacy. The essence of this modern Western individual-as-reader is captured by the sociologist David Riesman:

If oral communication keeps people together, print is the isolating medium par excellence.... The book, like the door, is an encouragement to isolation: the reader wants to be alone, away from the noise of others.... Thus the book helps liberate the reader from his group and its emotions, and allows the contemplation of alternative responses and the trying on of new emotions. (Riesman, 1960: 114, 112-113)

Needless to say, literacy seems to be a necessary but hardly a sufficient feature in the emergence of individualism. Non-Western countries, such as Japan, have developed high levels of literacy, but remain predominantly group oriented.

Analogous to the emergence of social individualism is the capacity for logical self-reflection. As we saw in our discussion of metalanguage, literacy (typically coupled with schooling) boosts the learner's ability not only to analyze language but more generally





to think clearly and logically. If Olson and his colleagues are correct, literacy turns "linguistically-expressed propositions into objects of thought" (Olson and Astington, 1990:705). Such transformative effects emerge time and again, wherever learners become literate.

And third, literacy as we know it in the contemporary West entails a set of presuppositions about how we encounter a text. Olson argues that a new model of reading emerged (at least for expository prose) that made the reader responsible for interpreting what message the writer intended and how the writer intended the message to be taken. Similarly, up through most of the twentieth century, the majority of authors of fiction have presupposed a model of story-telling in which the reader is asked to suspend disbelief, in return for which the writer promises a plot with a beginning, middle and end.

In the coming world of cybertext and cyberpedagogy, these legacies are subject to being recast if not abandoned. Assumptions about individualism, legitimacy of traditional interpretation and continuity of text are directly being called into question. The development of metalinguistic ability, heavily a product of formal education, may have an equally uncertain future as pedagogy becomes more student-driven.

What precisely does this projected future look like?

## The Future of Reading and Writing

> *The reader of a hypertext is always at least the co-author of the "text" that is read; sometimes the reader is the primary author.*
>
> Fowler, 1994b

The future of reading as the modern world has known it — the solitary reader engrossed in a book for pleasure or intellectual enrichment, working to discern the intended meaning of the author — was seen as imperiled even before the coming of the microcomputer. Writing in 1972, George Steiner observed that:

So far as I can make out, the prime requisites of concentrated reading in the old sense — aloneness, silence, contextual recognitions — are growing rare in the very milieu in which we would most crucially look for them — that of the undergraduate. (Steiner, 1972:206)

With the coming of multimedia CD ROMs and the Shakespearean corpus on-line, many wonder whether the allure of the new technology will be the final nail in the coffin of the traditional book.

What is this technological challenge to the traditional linear, durable model of the written word? It is the networked word — a communicative network in which messages are swapped across the hall or around the world, where the distinctions between author and reader blur, and where composition becomes something of a performance art.

The networked word comes in four main varieties. The first, which we might call stand-alone postings, are the closest to traditional writing. Included here are scholarly papers, electronic journals,the contents of Web sites — anything an audience is able to access. Like the authors of books in the library, the authors of such postings do not know in advance who their readership will be. And while they may accept comments and queries, authors presume that their work is at least a reasonably finished piece that will have some longevity.

Although the format of postings is often indistinguishable from that of their hard-copy cousins, the means by which we access them may change the relationship between reader and text. As both Havelock and Eisenstein have argued, encountering the word in a visible (written) and durable (manuscript or print) format affords readers the opportunity for reflection and analysis. Havelock emphasizes the potential for focusing on the logic of an argument literally laid before you, while Eisenstein points out the importance of easily accessible (and affordable) printed texts for comparative scholarship. On-line postings can, of course, be printed out, though the technology propels us to view rather than analyze, cruise rather than ponder, "hit" rather than read. Some postings now come complete with counters recording how many times the site has been visited. On-line scholarship risks succumbing to the lure of the best-seller list.

The second type of net writing is dialogue with known interlocutors (or at least with correspondents who introduce themselves under their actual names, genders and personae). E-mail and





computer conferencing are the two main venues for this kind of dialogue. Deriving characteristics from both speech and writing, such computer mediated communication between known corrspondents is composed with the assumption it will be ephemeral and not of lasting consequence. It seems plausible to argue that just as Web crawlers seem to hasten you forward to view the next set of ten hits in your search, the "Send" button in e-mail eggs you on to release your message without editing. E-mail memos tend to be chock full of typos and grammatical nonsense we would never dream of allowing in a traditional memo, just as some stand-alone postings of "research papers" are littered with unbelievably blatant errors.

The third category of network composition is anonymous interaction. This is the world of chat groups and MUDs (originally "multi-user dungeons" but now often characterized as "multi-user domains"), where users converse with strangers, play out alternative identities and create fantasy worlds. As with e-mail and computer conferencing, the transcripts of such exchanges are not intended to be archived.

But there is also a fourth kind of net writing — one that aspires to greater intellectual and literary stature. This is the realm of compositional hypertext. To most computer users, "hypertext" is a generic term referring to a principle (proposed by Vannevar Bush in the mid 1940s) for creating conceptually useful links between different texts or portions of texts. The models that readily come to mind are interactive encyclopedias, hypercard stacks or, most recently, Web pages. But the domain in which hypertext was first actualized in modern computing was written composition (hence our term "compositional hypertext"). In the words of Ted Nelson, who coined the term hypertext in the 1960s, "Literature is a system of interconnecting documents." (Nelson, 1984:2)

Compositional hypertext (and would-be literature) creates "networks of alternate routes (as opposed to print's fixed unidirectional page-turning) ... in which reader and writer are said to become co-learners or co-writers" (Coover, 1992:23). In this non-sequential mode of writing, multiple users interactively choose branches of the story (or poem) to develop, yielding a multi-authored product that is itself open to subsequent change

(see Bolter, 1991; Landow, 1992; Lanham, 1993). Software tools such as Storyspace and Intermedia offer writers (and students of writing) the wherewithal to create and navigate within such non-linear compositions.

The assumptions underlying compositional hypertext are clearly at odds with those of traditional print culture. Fowler (1994a) enumerates some of the familiar literary presuppositions against which compositional hypertext rebels:

1) authors can be distinguished from readers
2) a text is the property of its author
3) a text is (or should be) fixed, unchanging, unified and coherent
4) a text should speak with a single, clear voice
5) a text has a beginning and an ending, margins, an inside and an outside
6) the center of a text, of a group of texts or of anything else, is fixed, stable and single
7) a text is (or should be) clearly organized in a linear, hierarchical structure
8) generally speaking, an author writes by himself, and a reader reads by himself

Paradoxically, some of the strongest voices defending traditional (linear, single-authored, "finished") works of literature come from computer pundits. Bill Gates assures us in *The Road Ahead* that narrative fiction will remain largely untouched by the electronic revolution because novels are (at least historically) linear and won't benefit from random access. Negroponte has no intention of eliminating the classical literary form (and its printed presentation) either:

Interactive media leaves very little to the imagination. Like a Hollywood film, multimedia narrative includes such specific representations that less and less is left to the mind's eye. By contrast, the written word sparks images and evokes metaphors that get much of their meaning from the reader's imagination and experiences. When you read a novel, much of the color, sound and motion come from you. (Negroponte, 1995:8)

Is compositional hypertext as a mode of authorship a passing fancy, or will it fundamentally alter our modes of reading and writing? That depends upon whom you ask. While traditional masters programs in creative writing don't seem at a loss for candidates, if we believe the computer gurus, the days of the individual author are numbered:





As we return [from a print culture, where a story becomes "frozen"] to continuous information [of the electronic age], we can expect the importance of authorship to diminish. (Barlow, 1994:90)

## The Future of Learning

*Early in the next millennium ... schools will change to become more like museums and playgrounds for children to assemble ideas and socialize with other children all over the world.*

Negroponte, 1995:6

Compositional hypertext presupposes that intellectual activity is group oriented. Belief that the whole is greater than the sum of its parts, that the new tribalism heralded first by McLuhan (with his image of the global village) and now by advocates of the virtual community (e.g., Rheingold, 1993) is superior to isolated individualism, naturally leads to a more generalized communal model of learning:

Work in an environment permeated by electronic media tilts inevitably toward collaboration. Thus, labor in an electronic "information economy" takes on a new, intensely social character. (Fowler, 1994b)

Yet paradoxically, at the same time that the computer community is stressing the importance of collective learning, it is also predicting an intensely individualized pedagogical future. The growing development of technological tools enabling customized access to information would appear to foster solitary inquiry. Negroponte invites us to behold such individual opportunities:

Take the weather as an example [of how in the future, bits of information will not be confined to any specific medium when they leave the transmitter]. Instead of broadcasting the weatherman and his proverbial maps and charts, think of sending a computer model of the weather. These bits arrive in your computer-TV and then you, at the receiving end, implicitly or explicitly use local computing intelligence to transform them into a voice report, a printed map, or an animated cartoon with your favorite Disney character. (Negroponte, 1995:55)

Or consider his vision for books of the future:

In the post-information age, we often have an audience the size of one. Everything is made to order, and information is extremely personalized. (Negroponte, 1995:164)

Like personal pizzas, we can look forward to "books" for one, although once we eliminate the presupposition of a community of readers, it is no longer clear we are talking about the same notion of a book.

If Negroponte is right, it is the potential reader (or consumer via some other medium) who is in the driver's seat. Negroponte mints a useful image for characterizing the shift of pedagogical authority: a distinction between "pushing" and "pulling" information:

Being digital will change the nature of mass media from a process of pushing bits at people to one of allowing people (or their computers) to pull at them. This is a radical change, because our entire concept of media is one of successive layers of filtering, which reduce information and entertainment to a collection of "top stories" or "best-sellers" to be thrown at different "audiences." (Negroponte, 1995:84)

In the same vein, John Barlow, drawing upon the back-to-tribalism motif of latter day McLuhanites, speaks of us becoming information "hunter-gatherers." (Barlow, 1994:90)

The distinction between "pushing" and "pulling" information encourages us to reassess our assumptions about the roles and responsibilities of readers and writers in any medium (be it printed linear texts or interactively accessible hypertexts). For the sake of discussion, let us limit the context to expository writing, be it essays, philosophical discourse, historical recounting or sociological analysis. In our classical model of written language, the writer is responsible for laying out a coherent argument that guides the reader at each turn in making sense of what is being said. Readers, of course, have always had the prerogative to skip about in the text (to "pull" their own selection of information) or the potential to misread what the author intended. However, in principle, the author (sometimes supported by a classroom teacher) was available to steer the reader along the path of understanding. In exchange for being taken as authorities, writers have generally been subject to public standards. Finding one's way into print has typically (though admittedly not always) entailed a vetting procedure by which at least some people have judged the author as having something worthwhile to say.

But what happens to writers when the vetting process is suspended and to readers when there is no oversight as to what information is "pulled" (or "gathered") from where? Who will provide guidance on whether the texts (or sites) readers are accessing meet conventional standards of intellectual coherence or scholarly responsibility? Through what pedagogical process will readers or writers develop the tools for reaching such judgments? Can refereed on-line publications (which still take many months to produce) hope to compete with self-generated postings to the Internet that become available the moment the author is done composing? (See Taubes, 1996 for a discussion of on-line science articles.)





Does the computer presage the end of reading and writing and learning as we have known them?

## Back to the Future

> *"I hope you don't think I'd ever do anything like that, I mean, just step out of the drier, if anyone were seeing me. It was just viewing."*
>
> *"Same thing, isn't it?" asked Baley.*
>
> *"Not at all the same thing. You're viewing me right now. You can't touch me, can you, or smell me, or anything like that. You could if you were seeing me. Right now, I'm two hundred miles away from you at least. So how can it be the same thing?"*
>
> *Baley grew interested. "But I see you with my eyes."*
>
> *"No, you don't see me. You see my image. You're viewing me."*
>
> *"And that makes a difference?"*
>
> *"All the difference there is."*
>
> Asimov, 1957:63

This dialogue from Isaac Asimov's *The Naked Sun*, written three decades ago, takes place on the distant planet of Solaria, where inhabitants almost exclusively "view" each other through trimensional imaging systems rather than meeting face-to-face. Plainclothesman Elijah Baley, a detective sent from earth to investigate a murder, has just tuned in the rather attractive Gladia Delmarre (wife of the victim), unwittingly catching her quite naked as she emerged from a shower. While Baley "reddened to his hairline, and hastily turned away" (61), Mrs. Delmarre failed to see what the fuss was about. After all, Baley was "just viewing" her nakedness, not seeing it in person.

Does the world of the networked word portend communicative change as radical as that envisioned by Asimov on Solaria? The question bears exploring, especially since Asimov's vision bears uncanny resemblance to the newly emerging redefinition of relationships between interlocutors exchanging messages via computers.

Both trimensional viewing and e-mail are grounded in paradoxical assumptions about simultaneous closeness and distance. In the words of Robert Kuttner, describing e-mail exchanges with his daughter who had recently gone off to college:

There is something about e-mail, and its predecessor, letter-writing, that produces a comfortable blend of closeness and distance. That, in turn, lends itself to playful, safe intimacy. (Kuttner, 1995:A29)

Although both e-mail and letters share a common written modality, the social assumptions and expectations of users are becoming strikingly different. For starters, because e-mail is so easy to compose and send (you don't need to hunt up paper, a stamp or a mailbox), interlocutors (including Kuttner's daughter) will dash off dozens of e-mails a semester to people to whom they would somehow never get around to sending a single letter.

Second, unlike traditional letters (or even face-to-face speech), the networked word invites writers and readers very quickly to establish informal and frank social relationships with one another. Kuttner comments that he and his daughter are getting to know one another much better via e-mail than when they lived under the same roof. Contemporary college students sometimes report that e-mail has enabled them to reestablish ties with siblings they could not stand face-to-face. Anecdotally, e-mail users comment on how readily they adopt a casual tone — and often significant amounts of humor — with addressees they have never met.

But there is a third effect that the networked word seems to be having upon how we communicate within a social structure. In formulating both speech and traditional writing, we make certain presuppositions about the appropriateness of our formulating a message in the first place and about the willingness of our intended audience to receive that message. Exceptions notwithstanding (street corner evangelists, writers with little hope of being published), competent language users learn when to say (or write) what to whom and when to resign themselves to not getting their message across.




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The networked word seems to be changing this traditional model of communicative competence by rewriting the rules of access. At the most trivial level, we can send messages whenever it suits our convenience, irrespective of working hours or time zones. Much more profoundly, we appear to be changing the conventions of who has access to whom. We send e-mails to busy people on subjects we would not dream of interrupting them about with a telephone call or visit. And through e-mail, we gain access to interlocutors who might never see our letters or whose secretaries refuse to put our phone calls through.

What do emerging e-mail habits have to say about broader questions concerning the future of reading, writing and pedagogy? Just this: The networked word (as epitomized by e-mail) is radically redefining the relationship between message sender, recipient and the message itself. We are replacing the immediacy of "seeing" (seeing one another face-to-face, teaching face-to-face, developing an individual rapport with and response to a tangible text) with "viewing." This increasingly pervasive mode of communication creates a unique blend of closeness and distance that both loosens our metaphoric tongues and erodes a sense of verbal permanence.

Had Robin Hood learned rudimentary literacy and keyboarding, he might have felt quite at home with e-mail — or would he?


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Starting

with just a stone.

And now it's Futurism,

the modern world.

As transient is, i.e.,

life itself, a contemplative

world encountering trouble.

Transparencies,

euphoric groups of dynamic humans

starting up their purring motors, drawing

upon first light,

discarding

the grammatical order

of the past.

*The author has counted the various kinds of "literacies" used by educational scholars as titles on papers indexed in the ERIC database 1980–1994. The resulting 197 different literacies are listed and divided into five categories: literacy on a topic (computer literacy), literacy among certain people (prison literacy), literacy for a certain purpose (functional literacy), the ability to handle materials in a certain format in literate ways (Braille literacy) and levels of literacy (basic literacy).*

Dianne G. Kanawati has been fascinated with the eccentric nature of English grammar since she tried explaining it to Thai college students in her Peace Corps days. In recent decades, she has taught English at the secondary and post-secondary levels. This article began as a vagrant curiosity while researching her dissertation on Cultural, Functional, and Critical Literacies as constructs for approaches to general education. Dr. Kanawati received her Ed.D. in Curriculum and Instruction from the University of Georgia last summer.

11808 Radner Way · Raleigh, NC 27613
*Visible Language* 31:1
Dianne G. Kanawati, 38–49







# How can I be literate: counting the ways

To borrow a wonderful opening line, literacy stock has been bullish lately.[1] Not only is literacy a hot topic of discussion and publication, suddenly there seem to be just so many more ways of *being* literate — and, presumably, more ways of being illiterate as well. How did this plethora of literacies come about?

Part of the *literacy* phenomenon is due to the nature of the word *literacy*. It has, and always has had, two distinct meanings: one is the familiar "able to read and write" definition; the second is "command of a body of knowledge."[2] The use of literacy in this second sense has expanded exponentially in recent years and accounts for many of the *literacies* in circulation.

Besides the nature of the word *literacy*, the multiplication of *literacies* is also due to the nature of the English language. English has an exceptionally expansive and creative grammar which allows, even encourages, insouciant originality. English delights in new words (fax) and familiar words used in new ways (surf the net) or combined in new ways (liftoff, microchip). And, unlike many languages, English allows a variety of words to function as adjectives.

Adjectives function as adjectives, of course (sweet talk). Then there are the verb forms, including the –ing participle (running water) and the –ed or equivalent past participle (iced tea, forgotten melodies). Then there are the nouns. When placed in front of another noun, nouns can function as adjectives of composition (cotton shirt) or purpose (cake knife). So long as the correct order is maintained — which native speakers do quite intuitively — English allows adjectival constructions to indulge in prolonged concatenation without straining comprehension in the least. Consider, for example, a cheap little green plastic toy sports car.

So much flexibility can create a problem, however; the meaning is not always clear. Using a familiar example, a racing horse may be a horse *for* racing or a horse *that* is racing. When speaking, a shift in inflection pattern signals the distinction, but an author

Endnotes

1 Venezky, Richard L. 1993. "In Search of the Meaning of Literacy." *Educational Researcher* 22:3, 34.

2 Kintgen, E.R. 1988. "Literacy Literacy." *Visible Language* 22:2/3, 149.