Evolving Media, Shifting Literacy : A Western Historical Perspective

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Abstract

The digital computer screen is rapidly becoming the dominant medium for writing and reading in many societies throughout the world. Although this particular medium is new, the process of replacing one dominant medium with another has telling historical precedents. This article chronicles the major changes in writing media in the Western world from ancient scrolls to our now ubiquitous websites. It also explores the connections between writing media, cultural assumptions, and literacy practices in each era. Finally, a comparison of the major features of the dominant media, and suggestions regarding what this comparative historical approach implies for possible educational reforms in our digital era are offered.

Introduction

Writing has been with us for some 5,000 years. During this time, major shifts in the dominant media employed by people for literate purposes have been relatively rare. The use of papyrus scrolls, the shift from those scrolls to medieval codices, and then the shift from codices to the printed book stand out as the most prominent steps in the evolution of writing media. Currently, we are undergoing the latest major step in this process of technological evolution: the shift from print to digital.

In each of these historical moments of transition, it is not as if the new medium suddenly appeared and the old one just as quickly vanished. Rather, during transitional periods, the two exist side by side and influence each other, as the old gradually loses ground to the new. At some point in the process, the new medium becomes *dominant*: that is, it becomes the technology of choice for recognized authorities and powerful organizations, and eventually for the majority of the literate population. Bolter (2001) uses the term *remediation* for these transitional periods, and points out that they involve "both homage and rivalry, for the new medium imitates some features of the older medium, but also makes an implicit or explicit claim to improve on the older one" (p. 23). As we remediate from print to digital, it is easy to find digital documents that imitate their print predecessors, as well as ones that employ hyperlinks, graphics,

and other features in ways that present themselves as supposed improvements over what print technology could have offered. We are now at a point in the remediation process where it is less certain which medium is doing the leading and which is doing the imitating. For example, a simple comparison of almost any collection of newspapers or textbooks of today with those of thirty or more years ago will reveal a host of significant changes in how images, text, colors, and other design elements are presented and manipulated. Those linear, discursive texts of old have become the flashy, multimodal documents of today, raising the question of whether modern print documents are truly trailblazing in their own right or rather simply doing their best to keep pace with their digital cousins.[1] In other words, if the baton of dominance has not yet passed to the digital medium, it seems poised to do so in the very near future.

Perhaps pinpointing the exact moment in time when the shift in dominance from print to digital happened or will happen is less important than simply recognizing that this profound change is occurring in our age and considering how it might affect our lives. Being in the midst of such a wide-reaching transition can be unsettling for everyone, but it is especially so for educators as we find ourselves charged with the responsibility of preparing the younger generation to get by in a society saturated by a categorically different type of medium than the one we have so long taken for granted. The term *e-learning* has recently been coined for educational practices that make use of digital media. Given the transformation that society as a whole is currently undergoing, it should come as no surprise that e-learning and the fundamental pedagogical issues that it raises are assuming an increasingly prominent position in discussions of educational program reform. The hyperbole associated with the relatively new but suddenly pressing call to e-learning can be a bit overbearing at times, especially when it comes from the organizations that stand to profit most from increasingly wired schools, and a certain degree of critical distancing seems prudent. In order to begin to grasp what e-learning entails or could potentially entail, familiarity with the broader societal shift within which the move toward e-learning is situated might be helpful. The purpose of this article, then, is to try to shed some light on the revolution in dominant media that we are currently experiencing by reviewing its historical antecedents, comparing features of previous dominant media with the new digital medium, and briefly addressing some of the implications it may have for education.

1. The Role of Writing Media in Culture

Language is primarily oral. Of the thousands upon thousands of languages the world has known, most of them were never committed to writing, and barely over a hundred of them have used writing to the degree of having produced literature (Ong,

1982). Plato, writing at a time when writing was regarded as something remarkable, called the Greek alphabet a *techne*, the Greek root of *technology* (Bolter, 2001). Yet for those of us who live in societies saturated with writing, we tend to internalize it to such a degree that we fail to see our writing system as something separate from language and we easily forget that the media we use to write and, in fact, writing itself are technologies. Now that we are in a period of remediation, although the concept of writing itself is still generally taken for granted, attention is being drawn to the writing medium as an object for scrutiny to a greater degree than usual. We now have a golden opportunity to consider the role a medium tends to play in the process of creating and dispersing knowledge, and it is worthwhile to go beyond merely technical aspects when doing so. Pacey (1983) reminds us that any technology has not only technical, but also cultural and organizational dimensions. The technical aspects may be the most noticeable, whereas the cultural ones, though harder to pin down, perhaps provide the greatest insights into the underlying changes occurring in society.

The material properties of any medium naturally favor certain types of expression while inhibiting others. For example, print documents primarily support linear writing whereas the digital medium enables associative linking (Bolter, 2001). If a particular medium favors a particular type of writing style, it might also be said that it favors a particular kind of reasoning. As Ong (1982) points out, "logic itself emerges from the technology of writing" (p. 169). Perhaps we can also argue that the characteristics of the dominant writing medium in any historical period have an influence on the types of reasoning strategies that are generally accepted as "logical" during that era.

While the preceding example implies that a new technology can have the power to change fundamental aspects of human culture, it should not be taken as a facile argument for technological determinism. Technologies develop from within cultural contexts. They are not separate agents let loose upon us from the outside, and therefore they do not determine the course of societal or cultural progress, but rather reflect it (Bolter & Grusin, 1999). When a new technology seemingly bursts onto the world stage, a closer look usually reveals plenty of cultural antecedents that anticipated the changes that the new technology facilitates. Returning to the example of the digital medium's embrace of associative thinking beyond the linear straightjacket that print is so conducive to, we might take a look at significant literary trends of the previous century. Writers like Laurence Sterne, James Joyce, William Faulkner, and Jorge Luis Borges challenged the conventions of the linear novel in myriad ways, implicitly suggesting that the medium they were using was too restrictive to properly convey what they hoped to express; and the poststructuralist critique of systematic, linear argument that was ushered in by the likes of Roland Barthes and Jacques Derrida can be seen as an attempt to break free of the binds imposed by the print medium. Or one might take a

look at developments in philosophy, where Wittgenstein, Keirkegaard, and Neitzsche each posed challenges to linear argument in their own ways (Bolter, 2001).[2] Echoes of a shift from linear to multi-linear and associative reasoning and representation can also be found in art, architecture, and various sciences.[3] The point is that technologies do not suddenly appear out of nowhere and revolutionize human culture. Instead, new technologies arise as a result of trends that percolate in the vanguard of society for some time and eventually extend their reach. If a new technology sweeps through society and impacts it as quickly as the personal computer has in the last two decades, it strongly suggests that the necessary cultural groundwork has already been laid and its time has clearly come.

This argument ought to reassure those who fear that the computer and the digital medium it facilitates, or any new technology for that matter, are forcefully leading humanity down an undesirable path. Actually, humanity is the leader. Human culture progresses, and then clever people develop technologies to meet the new needs that arise. Everyone has a right to be critical of the "progress" and indeed articulate objections are frequently raised,[4] but blaming technology itself is unreasonable.

2. Literacy and Historical Episodes of Remediation

Whatever our personal views on the transformation from print to digital may be, situating this shift within a broader history of similar technological changes will perhaps help to clarify what its most marked features are. Thus, let us contextualize our present condition by taking a closer look at the initial emergence of literacy and at past episodes of remediation.

2.1 From orality to literacy

Though our current process of remediation from print to digital media may feel fluid and tumultuous to most of us, it no doubt pales in comparison to the upheavals that came about when writing first appeared in human societies. The first writing script, Sumerian cuneiform, appeared in Mesopotamia sometime around 3200 B.C. (Cooper, 1996). Considering that most anthropologists agree that Homo sapiens have been on earth for at least 250,000 years, we can say that writing is a decidedly recent technological invention when situated within the long flow of human history. Approximate dates for the appearance of some other early and influential scripts include Egyptian hieroglyphic around 3100 B.C. (Ritner, 1996), Indus Valley script around 2500 B.C. (Parpola, 1996), and Chinese around 1200 B.C. (Boltz, 1996).

Why did writing emerge in these and other societies? If we take a non-deterministic view of technology, we can assume that writing probably had antecedents and likely

developed in order to meet evolving societal needs. Writing has its roots in picture drawing and in the use of variously shaped clay tokens to record economic transactions (Daniels, 1996). As societies formed and economic activity increased, the need for writing apparently rose. Thus, the earliest writing system, cuneiform script, "served mostly workaday economic and administrative purposes in urban societies" (Ong, 1982, p. 85). Early scripts were mostly pictographic and eventually ideographic, but both Havelock (1986) and Ong (1982) argue that writing's biggest impact on humanity did not occur until the invention of the Greek alphabet around 700 B.C.

The Greek alphabet delimited sound units more abstractly and purely than the scripts that preceded it. By subordinating writing to a single phonetic principle, the Greek system successfully drained the pictorial meaning from the written characters (Bolter, 2001). The alphabet allowed words to be conceived of as consisting of smaller building blocks from a flexible and finite system, thereby positing a view of the written word itself as something separate from the actual thing it refers to in the material world, as well as from the user of the word, to a much greater degree than was previously possible. This shift in the conception of words from concrete and immediate things to ones of abstraction, separation and timelessness spread from writing in particular to language in general, and eventually to ideas, enabling Greece's birth of philosophy, its strengthened concept of self-hood, and its general intellectual ascendancy at that time (Havelock, 1986). In addition, as Ong (1982) points out, the alphabet was democratizing because it was relatively easy to learn, and internationalizing because it provided a systematic way to process foreign languages.

How did the oral worldview differ from the literate one that we now take for granted? In regards to human consciousness, what was lost and what has been gained? Havelock (1986) has commented on the near impossibility of answering such questions satisfactorily. Orality fossilizes when it is written down, its fluidity and vitality cannot be fully represented in writing, and yet we rely mostly on written artifacts as we try to come to some understanding of the pre-literate mind. This paradox leads to the use of labels such as "oral literature," about which Ong (1982) laments, "this strictly preposterous term remains in circulation today even among scholars now more and more acutely aware how embarrassingly it reveals our inability to represent to our own minds a heritage of verbally organized materials except as some variant of writing, even when they have nothing to do with writing at all" (p. 11).

The difficulties involved in trying to investigate the culture of orality and its relationship to literacy notwithstanding, Havelock (1986) charts a dramatic rise in interest in this topic that emerged in the early 1960s as a result of pioneering work in a number of scholarly fields by the likes of Claude Levi-Strauss, Marshall McCluhan, Ernst Mayr, and Jack Goody.[5] In retrospect, such a flurry of inquiry at that time into litera-

cy's origins is not so surprising given that we now can situate it as having occurred on the eve of the personal computer's cultural ascendancy. By the following decade, Goody's (1977) argument had progressed to the point where he was able to claim that the major historical shift in human consciousness, what previously had been called the shift from magic to science, or from prelogic to rationality, is best understood and explained as a shift from orality to literacy. A few years later, both Ong (1982) and Havelock (1986) commented extensively on a previously obscure gem of Soviet-era fieldwork by Alexander Luria who had long conversations in the 1930s in tea houses with nonliterates in a remote pocket of Uzbekistan. Among other revealing findings, Luria noted that these nonliterates, when confronted with geometrical shapes, would refer to them with the names of concrete objects that the shapes called to mind. For example, when shown a circle, his subjects labeled it a plate, a bucket, a watch, and so forth. Also, when confronted with the series *hammer, saw, log*, and *hatchet*, Luria's subjects consistently avoided categorization (e.g., three tools and one non-tool), instead opting for a sort of situational thinking. As one respondent put it: "They all look alike. The saw will saw the log and the hatchet will chop it into small pieces" (as cited in Ong, 1982, p. 51). In addition, in place of logical thinking, the subjects apparently combined their situational reasoning with heavy doses of narrative framing, and Havelock (1986) relates this finding to the mental necessity of framing ideas in story form in oral cultures in order to facilitate recall. In contrast, even the moderately literate members of Luria's Uzbek community, when posed with the same questions, were consistently able to think in abstract terms and to categorize.

This apparent relationship between the invention of writing and the onset of abstract reasoning deserves further exploration. Proceeding cautiously while recognizing the biases of our literate mindset, we can at least say that writing freed the human mind from the need for massive amounts of memorization because one of the major functions of writing is to serve as a storage place for ideas and narratives. Liberated from this need to conserve, mental resources were made available for new types of speculation. "As the memory function subsided, psychic energies hitherto channeled for this purpose were released for other purposes" (Havelock, 1986, p. 101). Some types of thought, including "abstractly sequential, classificatory, explanatory examination of phenomena or of stated truths" were impossible until writing entered the scene (Ong, 1982, p. 8).

Havelock (1986) offers further insights into the oral mind in his analyses of early Greek texts, such as Homer's *Iliad* and *Odyssey*, that surely existed as oral stories before writing technology came along to store them and, consequently, fossilize them. Among his findings are a predominance of parataxis (i.e., additive lists of coordinate clauses as opposed to subordination), directness, absence of hypocrisy, and a tendency

to call "a spade a spade rather than an implement designed for excavation" (p. 95). In other words, as with Luria's Uzbek subjects, abstraction and classification are generally absent in those early Greek epics.

Plato, although thinking and writing only 100 or so years after the Homer scribe, clearly presents the type of philosophical musings that can only blossom when writing has become firmly enough established in a society to free the mind of its need to memorize its cultural inheritance. Yet even in Plato's time, literacy was still seen as the new kid on the block and regarded with skepticism. Plato himself was critical of the new technology he was using. He has Socrates argue that writing is essentially *unresponsive* because a text will not answer calls for clarification or explanation, *inhuman* since it pretends to establish outside of the mind that which can only exist within the mind, and *enfeebling* in the sense that minds become weak if memory is entrusted to an external resource (as cited in Ong, 1982, p. 78).

From our modern perspective in which the technology of writing has been so thoroughly internalized, it is tempting to characterize Plato's *unresponsive* argument as so obvious as to hardly be worth mentioning, his *inhuman* argument as rather quaint now that we have come to regard ideas as commodities and generally feel comfortable with terms such as "intellectual property," and his *enfeebling* argument as contradictory given the intellectual heights that great thinkers, including Plato himself, have gone on to achieve with the aid of writing. Of course, such a modern critique as this is laden with the biases of the literate mind. Though we can sew together hints of what a completely oral culture must have been like, a full grasp of its richness is beyond us. Nevertheless, Plato's discomfort with writing, that upstart technology that was asserting itself in his age, serves as a telling precursor to the types of discomfort, confusion, and skepticism that each subsequent era of remediation, including our own, has entailed.

2.2 From the papyrus scroll to the medieval codex

Scrolls, particularly ones made from a series of papyrus sheets glued together, emerged as the first dominant writing medium in the Western world. There appears to have been small-scale use of alternative media such as wax tablets, clay, leather, slate, and sand, but their use was clearly less common than that of papyrus scrolls (Havelock, 1986; Sampson, 1985; Diringer, 1982). Scrolls were typically about 25 feet long, so, unlike a self-contained book, a single work usually required several scrolls. Bolter (2001) argues that this is why ancient writers seem to have been much less concerned about closure (i.e., the notion that an argument ought to lead to some tidy form of conclusion) than authors were in the age of print: "The physical unit of a writing technology helps to define the conceptual unit" (p. 77).

In most cultures that developed writing, a stage of "craft literacy" seems to have

occurred (Ong, 1982). During such a period, literacy is understood to be a trade practiced by a group of craftsmen, much in the same way that shipbuilding may be viewed. If you need a ship, hire a shipbuilder; and if you need a letter, hire a scribe. Scroll-based Greek society seems to have transcended this stage more quickly than others because of the ease of learning the Greek alphabet. Perhaps parallels can be found in our modern remediation toward the digital. Web designers have emerged as the literate craftspeople in the new medium, yet our reliance on them will likely recede as the technical skills needed to create digital documents become increasingly diffuse among populations.
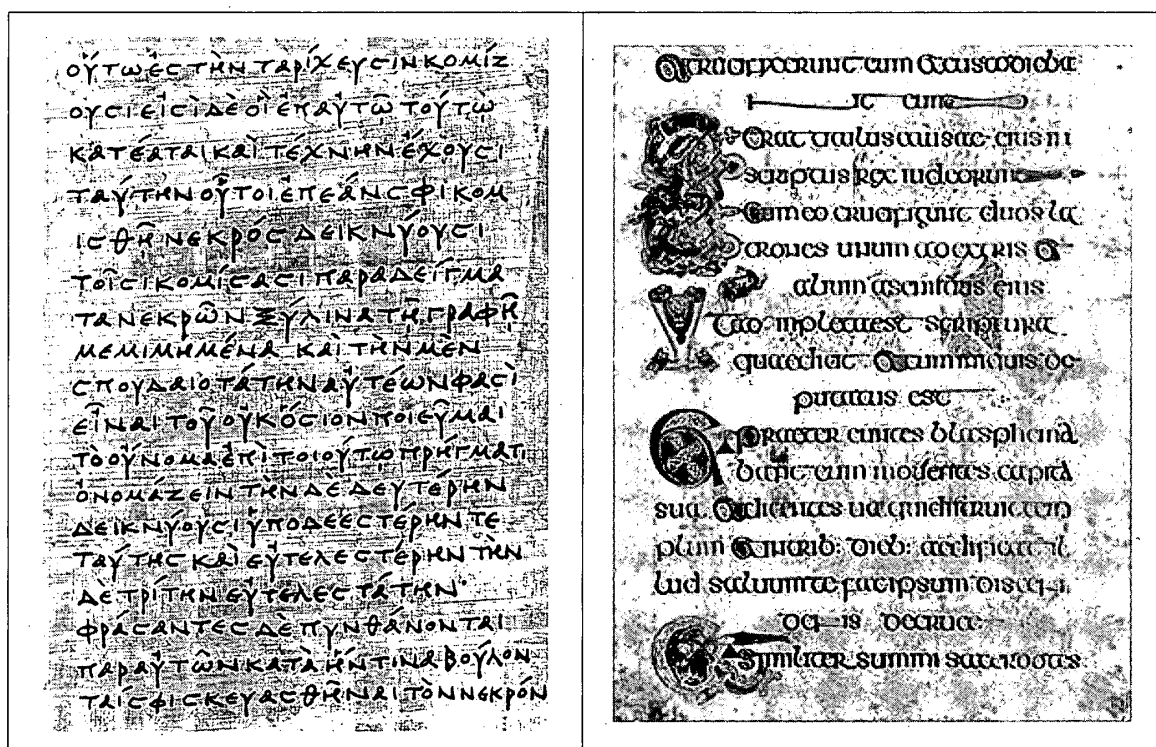

Figure 1: A fifth century B.C. scroll (left) and a ninth century A.D. codex (right)[7]

Although Egyptian hieroglyphic scrolls were often adorned with illustrations,[6] Greek and Roman scrolls typically did not contain any images. The medium seems to have been regarded by them as a purely alphabetic space used to store spoken words so that they could be retrieved for future orations (Bolter, 2001). The left side of Figure 1, an extract from a Greek fifth century B.C. scroll that describes mummification customs, exemplifies the typically austere visual space of this medium. We can surmise that the ancient Greeks and Romans valued the papyrus scroll not so much for its material qualities but for its function as a storage device for the ideas encoded in the words written upon it, in the same way that relatively unadorned books in the age of print were conceived of as transparent "windows" allowing direct access to authors'

thoughts. Yet this medium-obviating emphasis on transparency does not appear to have been the ideal during the age of the medieval codex, the dominant medium that intervened between the eras of the scroll and the printed book.

The medieval manuscript, or *codex*, began to emerge in the second and third centuries A.D., marking an evolution in authoritative writing from a scroll format to a paginated book. The use of papyrus for pages proved to be problematic because it tends to crack in codex form (Diringer, 1982), so papyrus gave way to parchment, and eventually to paper. Writers gradually refashioned visual features of the writing space by inventing punctuation, inserting headings, using blank space to indicate word boundaries, and decorating initial letters. Some of these advancements can be seen in the example on the right in Figure 1, a typical page from perhaps the most famous of medieval codices, the early ninth century Irish *Book of Kells*. In addition, the codex had the luxury of margins on every page, and the original scribe or his readers sometimes used them to add critical notes and glosses to such an extent that "in some scholarly medieval codices, the page became a web of text and interpretation" (Bolter, 2001, p. 22). To understand why this happened, we need to remember that until the invention of the printing press, copies of written texts were relatively scarce. They were prized possessions of elite institutions or individuals, passed from one generation to the next. Readers added explanations and commentary to the original writer's text for the supposed benefit of subsequent readers.

It is tempting to view this interactivity between reader, text, and other readers that the medieval writing medium facilitated as a sort of precursor to the interactivity that our currently ascending digital medium heralds, although admittedly under radically different time constraints. At any rate, with its complex writing space that could array a main text, secondary commentary, illustrations, and ornamentation on a single page, we can say that the codex as a medium was the forerunner that, at least in visual terms, most resembled the digitally produced documents of today.

Enlightened writers in the age of the codex, as they considered the physical properties of their medium and made original use of organizational tools such as headings and punctuation, as well as ornamental ones like decorated letters, must to some extent have realized that they were using the medium itself to shape the message. In this sense, the codex is radically different from unadorned ancient scrolls that were primarily regarded as depositories where orations could be stored and retrieved when needed. This growing awareness of the impact of visual elements on the reader's interpretation of a text indicates the evolutionary progress of the literate mind. Nevertheless, Ong (1982) points out that we can still find plenty of evidence of the tenacity of the oral mindset in medieval and Renaissance society. For example, although teachers at the universities that were beginning to appear across Europe based their lectures on texts,

examinations were always oral. Also, theologians and philosophers typically presented their ideas in writing as a dialogue-like series of objections and responses, and renowned narrative works such as Boccaccio's *Decameron* and Chaucer's *Canterbury Tales* are framed within the conceit of a gathering of people orally telling stories to one another.

It should also be emphasized that literacy in the age of the codex was not widespread among the general population. This would eventually change as the codex's successor, the printed book, assumed its position of dominance.

2.3 From codex to print

The next episode of remediation began with Gutenberg's invention of the printing press in the 1450s. At first, the change that the printing press portended for writing must have appeared rather subtle. Early printed pages were made from the same types of paper that their codex contemporaries were, and there were no major changes in binding techniques (Bolter & Grusin, 1999). Thus, in terms of the physical qualities of the medium, it was a far less dramatic shift than the previous remediation from scroll to codex. In fact, even the way that text was presented on the pages of early printed books paid homage to its predecessor through imitation. Layout features did not change significantly, the same abbreviations and ligatures (i.e., conjoined letters such as *æ*) were regularly used, and thick, heavy letters imitated the handwriting of scribes (Meggs, 1998).

Figure 2: Pages from a 13ᵗʰ century codex (left) and a 16ᵗʰ century printed book (right)[7]

The page on the left in Figure 2 is from a mid-thirteenth century Latin breviary codex used in England, and its counterpart on the right is from a Bohemian bible printed in Venice in 1506. Though they were produced with different technologies and roughly 250 years separates them, remarkable similarities abound including the use of dual columns, initial letter illumination, and encroachment into marginal spaces. Differences are noticeable as well, but the similarities serve as a testament to the power that a waning medium is able to retain over the popular conception of the writing space even as we remediate toward a radically different medium.

It was not until several generations after the invention of the printing press that the page began to acquire a more streamlined and austere surface as thin typefaces that consumed less ink were increasingly employed, and the paragraph in the modern notion as both a typographical and conceptual unit was invented as a result of the linear and hierarchical reasoning that the new medium facilitated (Bolter, 2001). Also, the interpretive notes that cluttered the margins of medieval codices were banished to the foot of the page, the end of the text, or removed altogether in the typical printed book. This change helped foreground the main text and thereby enhanced the printed book's appeal as an appropriate vehicle for expression during the Enlightenment: An era that gave birth to Newtonian science and generally regarded reasoned arguments as linear, self-contained units that are fashioned by individual voices of authority. Also, by casting the writing process in terms of an author whose work is brought to finality before going to press and then the text is bound and presented identically in multiple copies, it encouraged a sense of completeness, definiteness, and closure (Ong, 1982). For better or worse, the printed book's predecessors clearly did not offer to delimit and finalize units of thought so thoroughly.

Perhaps the most revolutionary aspect of the printing press was its ability to mass-produce books. McCluhan (1962) famously called it the first assembly line, and the radical implications of such an invention did not sit well with everyone. Ong (1982, p. 79) quotes Hieronimo Squarciafico who, in 1477, complained that the "abundance of books makes men less studious" and warned that memories would be destroyed and minds enfeebled by the growing availability of printed books. His lament echoes Plato's earlier fears about writing itself, and serves as a reminder that remediation episodes tend to be tumultuous for those of us who live during them.

The invention of the printing press not only made texts more available by dramatically increasing the number of copies that could be economically produced, it also added a degree of uniformity in the copying process that was impossible with previous media technology. Until worn in and marked up by its owner, one copy of a printed book looks exactly like any other copy of it. In contrast, a reader of a venerated codex would have been constantly reminded of the scribe's handiwork through a particular

handwriting flourish, an original decorative style, or some other idiosyncracy. Add to this the possibility of encountering comments in the margins from previous readers, and we can imagine that the medieval reader was quite conscious of the intermediary role of the medium itself as he used it to approach the ideas put forth in the text contained therein. It is this awareness of medium that the printed book so successfully diminished. Visible elements still existed on the printed page, but their uniformity allowed them to fade from the reader's consciousness so that full attention could be given to the propositional content of the text. "The fact that the layout of the book adhered strictly to the observance of regular margins around the text, therefore displaying writing as *a block of text*, both obscured this fact of layout by making it invisible through its 'naturalness', and at the same time intensified the meaning of *regulation*, much as did the stiff collar worn by the military and white-collar worker alike" (Kress, 1998, p. 59).

By rendering its presence invisible through maximum uniformity of its visual space, the printed book allowed author and reader to share in the conceit of immediacy, as if the author were "speaking" directly to the reader or the reader were gazing through a window directly onto the writer's thoughts. This elevated regard for the benefits of strict regulation of the writing space is in some circles still taken as a matter of course, and for proof one need only look at modern professional publication style manuals that specify everything from font type and size, to margins widths, to acceptable abbreviations and footnote conventions. The rigidity of such prescriptions results from an understanding that any deviation from an established norm can potentially shatter the pretense of the printed page's transparency, and will thus be too jarring for readers who have grown to expect an obviated medium.

This ideal of uniformity has spread to the way ideas themselves are presented in a text, and it materializes in the writing advice that teachers have tended to give to students in the age of print, at least until very recently. Lanham (1993) argues that typical writing advice is derivative of what he labels the "C-B-S theory of language" (clarity, brevity and sincerity) and he suggests that it was well suited to the zeitgeist of the industrial age, but that it is high time educators move on from this model in order to meet the needs of a changing society and evolving media. Similarly, Ong (1982) argues that print was a suitable medium for an age that witnessed rapid industrial growth and the triumph of commerce because the moveable type alphabetic printing press "suggests that words are things far more than writing ever did" and therefore it "embedded the word itself deeply into the manufacturing process and made it into a kind of commodity" (p. 116). Thus, unsurprisingly, it was not until the age of print that the notion of plagiarism emerged and copyright laws came into being.

The technological breakthrough of the printing press eventually led to unprece-

dented literacy rates in developed societies. It also attached the notions of homogeneity, linearity, regulation, authority, transparency, closure, and ownership to our general concept of writing and, by extension, the thinking process itself to a far greater degree than did the dominant media that preceded it. Now print is being challenged by the digital medium, and therefore the ways in which thoughts are organized and presented on a written page are once again evolving.

2.4 From print to digital

As noted previously, the twentieth century witnessed a wide range of thinkers and scholars who, in a variety of ways, have hinted at an eminent revolution in writing media. One of the most prescient cases is that of Vannevar Bush who, writing in the *Atlantic Monthly* in 1945, proposed but never actually built a sort of interactive encyclopedia device called a "memex." His proposal consisted of a screen that could simultaneously display two microfilm documents, and the user could create links between passages of text for subsequent retrieval. In essence, he was proposing a rudimentary hypertext, and the *Atlantic's* editor foresaw that it would have the power to forge "a new relationship between thinking man and the sum of knowledge" (as cited in Bolter, 2001, p. 35).

The term *hypertext* first appeared in the 1960s, and the World Wide Web was first proposed in 1989 as a research tool for scientists to share data more easily, although some networks of computers were linked to each other in closed systems during the 1980s before the Web entered the scene (Bolter, 2001). The first graphical interface for personal computers was invented in 1993, and this proved to be the turning point for global hypertext and the World Wide Web because it caused people to regard an Internet-connected computer as something with vast commercial and recreational potential, rather than simply as a number-crunching tool for researchers. In the following years, the personal computer and its cousins such as mobile phones with text-messaging capabilities have reached such a state of ubiquity in developed societies that many of us now find ourselves confronted with digital writing more often then printed texts.

3. The Digital Medium Compared to Its Predecessors

Are there features of our new writing medium that have clear analogs in any or all of its predecessors? If so, what are those features and in which eras have we encountered them? Asking questions such as these helps us to ascertain where in the history of writing technologies we might turn to for guidance when trying to come to terms with aspects of our current situation. Also, it helps us to delimit exactly what it is about our

digital medium that is truly unprecedented and revolutionary, thereby hopefully en-
abling better informed choices when we wrangle with decisions about how best to
prepare our students to cope in a society saturated with digital texts.

3.1 The rise of the visual

Digital technology allows for greater and faster manipulation of images than had
been possible with previous dominant media, resulting in a major shift in the text/icon
ratio of many types of documents. Recent generations also encountered illustrations in
the writings they came across, but those illustrations were most often subservient to
text. Now, in digitally-produced documents, images assert themselves more strongly
and tend to offer enhanced or alternative readings of a text (Abbott, 2002). Users of
digital writing technologies are "challenging the ideal of purely verbal communication
that went largely unquestioned during hundreds of years in which printing was our
dominant technology" (Bolter, 2001, p. 119-120), even though many of these users are
surely unaware of participating in such a revolutionary act. This is not to say that ver-
bal expression is finding itself increasingly unwelcome in the digital medium. It is just
as easy, if not easier, to produce a purely verbal document with a computer keyboard as
it was on a mechanical typewriter or with a fountain pen, but the verbal mode of
expression can now be augmented with the visual mode in ways that used to be
impossible. Thus, the range of possibilities for organizing and expressing conceptual
thought has been expanded. Digital illustrations are helping members of all sorts of
professions, from artists planning large-scale projects to scientists studying the patterns
of behavior in chaotic systems, to get stronger and more varied conceptual grasps of
their topics. As Lanham (1993) put it, the rise of visuality has to do "not with orna-
mentation of a preexistent rational argument but with an expanded sense of human rea-
son itself" (p. 125).

When we speak of the role of visuality in literacy, it is useful to think of two
basic types of images: those that offer themselves as "windows" onto some aspect of a
"reality" that the writer wishes to illustrate, and those that intentionally call attention
to themselves as meaning-shapers. A typical example of the first type is a photo-
graph of a crime scene accompanying a text about the crime. An example of the sec-
ond type that I recently came across is a yellow smily face bouncing next to the most
highly recommended links in a list of links on a website. There are a number of ways
to characterize these two basic types of images. We might do so in terms of *trans-
parency* as opposed to *opacity*. Other possibilities include *immediacy* as opposed to
hypermediacy (Bolter & Grusin, 1999), and *looking through* as opposed to *looking at*
(Lanham, 1993).

Whatever labels we choose, the important point is that in digital technology, we

have for the first time a dominant medium that makes extensive use of both. The Greek and Roman papyrus scrolls, regarded primarily as textual storage devices, generally made use of neither. The medieval codex usually had opaque ornamentation that called attention to itself, but rarely included images of the transparent type. Indeed, in the heyday of the codex, the camera had not yet been invented; and one-point perspective, the artistic breakthrough that allowed paintings and drawings to be drawn to scale and therefore appear realistic, was not exploited until roughly the same point in the fifteenth century when the printing press made its debut.[8]

As for print, it has already been mentioned that formatting conventions eventually became so regulated that the medium approached invisibility. It seems that the ideal writing surface at the zenith of the print era was a white page neatly covered with a block of black text, one page nearly indistinguishable from any other page. The simplicity and severity of this minimalist interface reflected what was technologically and economically feasible given the mechanical mass production process of the press. Also, by inviting readers "to look through a deliberately transparent and fixed black-and-white surface of verbal symbols to the conceptual universe beyond" (Lanham, 1993, p. 73), print also seems to have facilitated the cultural assumption of its era that serious and authoritative reasoning and discourse naturally ought to provide an unembellished "window" onto supposed truth. When images did appear in print texts, they tended to be of the transparent kind: realistic drawings, no-nonsense graphs and tables, and photographs once the technology to include them in books was developed. Decorative motifs of the kind that adorn the margins and letters of the codex page in Figure 2 came to be regarded as frivolous in serious print documents and unnecessarily costly to reproduce. Digital documents, in contrast, typically situate text within transparent and opaque visual elements, causing readers to oscillate between *looking at* the medium itself and *looking through* it to the propositional content conveyed.

The digital page from a university website on the right in Figure 3 exemplifies the visual richness of the digital medium with its inclusion of transparent photographic images as well as opaque graphics such as buttons, bars, and menu icons. In digital documents like this, images are reasserting themselves after the print era's logocentric interlude to a remarkable degree. At times, the graphic wealth of our new medium echoes the visual heights scaled in some medieval codices, such as is evident in the *Book Of Kells'* clever use of architectural columns and roofing to house text on its Canon Table page exhibited on the left in Figure 3.

Figure 3: Pages from a 9ᵗʰ century codex (left) and a 21ˢᵗ century digital website (right)[7]

While both pages in Figure 3 can be said to cause readers to perform an interpretive toggle between iconic and textual content, this oscillation is more pronounced in the webpage because the realistic photographic elements invite us to partake in the illusion of looking through the medium onto the world beyond. Also, the text itself in the digital medium typically appears in various shapes, sizes, and colors, adding a degree of opacity to symbols we have grown accustomed to looking through. In short, though the codex can to a certain degree be seen as a forerunner to the modern webpage, the latter generally presents a more visually complex space that compels a critical reader to repeatedly shift back and forth between being absorbed in the propositional content and being aware of the intervention of the medium.

This notion of intensified oscillation is crucial for understanding what is *new* about our new medium. Not only does the visual smorgasbord on the screen cause it, but the complexity of manipulating the medium itself causes a secondary oscillation to occur as well. While the sophistication of computer-generated graphics are able to create increasingly "real" experiences, "the buttons and menus that provide user interaction can be seen as getting in the way of the transparency" (Bolter & Grusin, 1999, p. 33). The experience is akin to being absorbed in a movie at a theater, only to have the person next to you sneeze and thereby remind you of where you are and what you are engaged in. This toggle between absorption and distancing happens on a smaller scale but happens repeatedly as users work with their mouse and multiple "windows" on a digital screen that frames increasingly multimodal documents.

3.2 Adding a third dimension

Though a single printed page of unadorned text has both height and width, a literate person encountering such a page knows immediately where the information contained on it starts and in which direction it flows. In the case of English, it starts in the upper left area and proceeds rightward in a stack of linear rows. Thus, although the actual materiality of the page is two-dimensional, it is typically conceived of as a one-dimensional space: We do not focus on the page as a whole as much as we use our eyes to follow the linear unfolding of the words on the page. In contrast, an ornately adorned page of text, such as can often be found in medieval codices, makes greater use of its two dimensions. Eyes are likely to survey the page both horizontally and vertically as the words and their accompanying images are viewed. Such pages, especially ones with decorative borders or cluttered margins, tend to be regarded by typical viewers as two-dimensional surfaces.

Like the codex, pages of digital documents are able to juxtapose text and images to such a degree as to appear two-dimensional, but digital pages viewed on the Internet typically go a step further: They offer a third dimension through their use of hypertext. The links contained on a hypertext document offer immediate retrieval of associated documents at the click of a mouse. Some links replace the current document with a new one, whereas others stack the new one on top of the old in a new "window." Even with links that replace rather than stack, a browser's *forward* and *back* buttons allow a user to rifle through the range of viewed pages in either direction, creating the impression that the pages are digitally layered one on top of another. This inclusion of depth adds a third dimension to our conception of writing space that all previous dominant media were unable to entertain. A printed book is, in fact, a stack of pages but it is not possible to press a word on page forty-two in order to have an associated passage from page ninety-six instantly appear. In other words, neither the writer nor the reader conceives of the printed book as having this depth dimension. Although a book's index can be seen as a primitive antecedent to the associative connections made possible by hypertext, an index is always conceived of as a secondary add-on to a canonical order that has already been determined for us by pagination (Bolter, 2001). The ease with which elements of linear, hierarchical, and associative thinking can coexist in the digital medium is unprecedented. The evolution of our writing space into a seemingly three-dimensional surface is no small matter, and fully warrants the increased attention that literacy theorists and educators are currenty giving it.

3.3 Literacy as diffuse and multidirectional

Certainly one of the greatest achievements of the print era was the unprecedented wave of mass literacy it brought about. No doubt the medium itself helped to facilitate

increases in literacy rates by making copies of texts much more widely available than they previously had been. Also, print offered a greatly simplified and conventionalized writing space compared to its predecessor, thereby positing reading and writing as manageable, straightforward skills that ought to be achievable by nearly everyone rather than just elite segments of society.

However, when considering the role of literacy in any society, it can be instructive to look more closely at the types of literate practices that were common. Details of ancient scroll-based societies are sketchy, but it is reasonable to assume that most non-elites did not have easy access to papyrus and other writing materials. Also, it seems that most people encountered texts audibly through the lips of orators rather than visually with their own eyes, so there was no necessity for widespread reading skills. In the medieval era, not everyone had easy access to codices, and for those who did it seems that writing was practiced by only a small percentage of those who were able to read (McKitterick, 1990).

In the age of print, writing for a wide audience required access to a printing press. This was, of course, impractical for most people. Thus, with the exception of novelists, newspaper columnists, and others who made a living from writing, the vast majority of people likely regarded their primary literate role in the public sphere as consumers of writing rather than as producers of it. Even in the case of prolific letter writers or those of us obliged to write essays for teachers, such texts had specific readers in mind and were unlikely to ever end up in multiple print copies for mass consumption. For the most part, written information in the public domain was unidirectional in the sense that it flowed from the few who had printing press access to those who did not. Publishers in the age of print had the gate-keeping power to decide who could and who could not have wide readerships and, regardless of whether they published in a society with a relatively free press or were answerable to other authorities, they based their decisions on some sort of criteria. By definition, criteria are discriminatory: Not everyone passes through the gate. It is not surpising, then, that public writing in the age of print has come to be associated with power, authority, and stability.

In contrast, the digital medium is not inherently associated with authority and it is open to novel forms of expression because it is relatively easy to gain access to a computer server, and anyone with such access can digitally publish his or her own texts without an intermediary and for a potential audience of millions. Thanks to the legacy of print, literacy is now assumed in many societies to be a basic skill that everyone ought to master, but we are now entering an era in which every literate person is empowered to write for potentially large audiences rather than just count oneself as a member of someone else's large readership. Also, the digital medium allows the unidirectional flow from authoritative writer to reader to be recast as a multidirectional

flow between a limitless number of writer/readers.[9] Whereas the print medium evolved into an organ for authority figures to address the masses in a relatively unilateral fashion, the digital medium promises a much more democratic writing space. A bidirectional relationship has always been possible on a private scale between letter writers, but now the turn-taking can occur digitally for all to see and has accelerated to such a degree that we even use the term *chat* for one thriving genre of computer-mediated writing because it reminds us of the rapidity that used to only be possible in oral exchanges.

3.4 The reemergence of orality

Digital writing is more fluid and dynamic than its predecessors. Unlike the finality of a book that has gone to press, a digital document can easily be revised at will. The fact that a website author can change something in the public domain with a click of a mouse undermines the sense of permanence that we have come to attribute to writing in the age of print. Ong (1982) has illustrated ways in which recent technologies such as radio and television have ushered in an age of *secondary orality* which in some aspects echoes pre-literate primary orality, especially in its ability to foster a communal sense and to focus on the present moment. Though digital writing for the most part lacks the auditory aspect that we might assume is essential to orality, its impermanence and the multidirectional interaction it is able to facilitate between users can be said to emphasize the present and foster communal attitudes as well.[10]

As touched upon earlier in the discussion of visuality, every medium presents a surface that can be *looked at* and *looked through*, but the dominant media have differed in regard to the degree to which they have tended to invite one or the other. Realistic images and unadorned words urge us to look through the medium, whereas non-photographic visual elements and words that are decorated or presented in a variety of styles invite us to look at how the message has been tailored. In stark contrast to print, the interactivity, multimodality, and volatility of the digital writing surface greatly intensifies this oscillation between transparency and opacity. Generally, readers of digital texts are not invited to focus solely on the message as they usually are in a printed book, but rather to simultaneously appreciate the message itself and the clever (or clumsy) ways in which the writer has decided to package and deliver it. As Lanham (1993) points out, this can be seen as akin to gestural symmetry and signals the return of rhetorical delivery and interpretation skills that have long been more commonly associated with orality.

Rhetoric has traditionally been the academic field most directly concerned with the deliberate packaging and presentation of messages. In medieval times, rhetoric was the most esteemed of disciplines. It was considered essential training for scholars

and it functioned as the core that held tertiary curricula together (Lanham, 1993). During the age of print, the number of academic disciplines increased and become more specialized, and the ideal of a cohesive, cross-disciplinary educational experience grounded in rhetoric was gradually set aside and replaced with the more splintered organizational model of departmentalization apparent at most universities today. Now that our dominant medium is shifting to the more complex rhetorical space that the digital screen offers, we may eventually witness a return to a more comprehensive model of education that distills learning through a rhetorical foundation, even if the term *rhetoric* itself is no longer employed due to the somewhat negative connotations it has acquired during the age of print. If so, it may be worthwhile to take a second look at the theories of learning and the educational paradigms that existed up through the Renaissance. If we fail to seriously consider historical precedents and smugly assume that previous eras have little to teach us, our notions of what is possible in education will be colored exclusively by what we have come to take for granted during the recent age of print, and this may leave us less than fully prepared for the challenges that the digital medium poses.

3.5 Summary of comparable features

Table 1 offers a side-by-side tally of the presence or absence in each dominant medium of some of the more important features mentioned thus far. A simple count of the checks in each column suggests that the digital medium is our most complex and versatile writing space to date, followed by the medieval codex.

Table 1

Presence or Absence of Selected Features in the Four Dominant Media

Feature	Scroll	Codex	Print	Digital
Textual	√	√	√	√
Visual	–	√	–	√
One-dimensional	√	√	√	√
Two-dimensional	–	√	–	√
Three-dimensional	–	–	–	√
Elite literacy	√	√	√	√
Mass literacy	–	–	√	√
Unidirectional	√	√	√	√
Multidirectional	–	?	–	√
Permanent	√	√	√	?
Volatile	–	–	–	√

(The table header "Medium" spans the Scroll, Codex, Print, and Digital columns.)

Of course, all of the media make use of written language, so they all have a textual element. Only the codex and digital writing, however, seem to make a serious effort to exploit images, graphics and other visual elements for meaning-making purposes. Because all of the media are capable of representing linear trains of thought via text, they can all be construed as one-dimensional. But the non-verbal visuality of the codex and digital medium are also able to stress the two-dimensional surface of the page, and only the digital medium can be regarded as a three-dimensional surface because of what the hypertext link adds to writing. In essence, links are simply replacements (Joyce, 1995). This ability to replace the current document instantaneously and end-lessly by simply clicking a button gives the digital screen a feeling of three-dimensional "depth" that previous media lacked, and offers unprecedented technological support for including associative thinking in the documents we write and read.

Table 1 also shows that, whereas only elite members of society generally had access to scrolls and codices, print and digital media carry with them the expectation that literacy is a realizable goal for the general population. It also shows that although all of the media are able to support a one-way transmission of information from author to reader, only the digital medium offers to make this a more multidirectional process that complicates labels like *author* and *reader* because of the expanding roles of both. A question mark has been inserted for the codex in the *multidirectional* category because although the extensive use of margins for reader commentary can be seen as facilitating a sort of multi-authorship, it seems unlikely that such comments regularly looped back to original authors. Even if it did occasionally happen, surely it occurred at an altogether different pace than the rapidity of exchanges enabled by the digital medium.

Finally, ever since it first emerged, writing has been construed as offering a way to permanently record our thoughts, but I would argue that this notion of permanence weakens considerably in the digital medium. In fact, if we backup our digital documents properly, permanence is technically achievable, but the fear that computer malfunction can at any moment cause our digitally-stored writing to vanish lingers in the minds of most users today. For many of us, a true feeling of stability and permanence is not achieved until we print digital documents. In such a medium, the notion of permanence increasingly gives way to one of volatility. Digital documents are much easier to revise than those of earlier writing media, and most Internet users have probably visited websites that change annually, monthly, weekly, daily, and even hourly. This is not the same as oral exchange, but our new vehicle for literate activity is increasingly encroaching on the impermanence and timeliness that were once assumed to be exclusive attributes of orality.

4. The Role of Education in Our Era of Remediation

A shift in dominant writing media represents a deep and fundamental change in human culture, and the question of how educational practices ought to change in response to such profound technological change is a massive one. "Indeed, the new technologies and cultural spaces require us to rethink education in its entirety, ranging from the role of the teacher, teacher-student relations, classroom instruction, grading and testing, the value and limitations of books, multimedia, and other teaching material, and the goals of teaching itself" (Kellner, 2002, p. 164). A comprehensive attempt to address these issues is far beyond the scope of this article, but it may be worthwhile to point out a few of the educational consequences of remediation that a historical perspective helps us to see more clearly.

First, it ought to be obvious by now that in order to best prepare students, educators need to make use of the same technologies that create and sustain literacy in the general society. Broadly speaking, our goal is to help students become competent in dominant social practices, and we can no longer effectively do so without recourse to digital technology. This is generally understood, hence the rush for schools to become wired. But since few of us in the current generation of teachers feel fully competent in the new digital medium and its applications, the doors of many of our schools have been opened to an unprecedented degree to private sector consultants and contractors. This makes education increasingly vulnerable to corporatization and threatens to undermine fundamental educational tenets if we are not vigilant. Seen from the outside, schools are now targeted as hotspots of entrepreneurial opportunity, and "teachers should be in no doubt that their profession and occupations are under attack by unfriendly forces" (Lankshear, Snyder, & Green, 2000, p. XIV). If we do not feel sufficiently prepared to take on the challenges of the new medium ourselves we may need to wait until the next generation of educators comes along as they are sure to be more digitally savvy. In the meantime, the least we can do is to guard the doors of our schools against those looking to turn our ignorance into easy profits.

For those among us who do not wish to simply leave it up to the next generation of teachers to tackle this thorny issue of remediation, we need to search for productive paths forward. One useful starting point may exist in thorough reflection on and reevaluation of the tendencies and biases of the age of print. This is where I believe historical perspectives such as the one I have tried to offer here can be useful: They help us to recognize that commonly held assumptions are neither eternal nor inevitable. For instance, they help us to see that attributes such as authority, permanence, and transparency that have long been enmeshed with our concept of writing are not essential qualities of literacy itself, but rather emblematic of a particular era's

understanding of literate practices and facilitated by a particular medium.

Assuming the comparisons presented in Table 1 are generally accurate, it is not difficult to make observations about a few of the possible educational implications of the rising digital medium. First, the invention of the hypertext link adds an unprecedented and revolutionary "third dimension" to our writing space, and students will need to learn how to manipulate it as writers and critically interpret its uses as readers. Essentially, this means that students need training in lateral as well as linear and hierarchical thinking. Next, the volatility and impermanence of the new medium is also unprecedented. One implication of this is that the assumptions of orality seem to be encroaching on writing to a greater degree than ever before, causing a blurring of the boundaries between traditional language skills and inviting new curricular approaches based on more holistic paradigms. Also, compared to what we encountered in the age of print, the visual complexity of the digital medium is remarkable. This suggests that it might be worthwhile to take a closer look at how image and text were combined in medieval times to create effective spaces for sharing knowledge, and what this might imply for educational practices. Certainly there must be many aspects of medieval education that we would be foolish to emulate, but given that somehow the medieval worldview eventually blossomed into the European Renaissance, it is likely that there are some recoverable gems that have been temporarily obscured during the recent and more restrictive age of print.

Finally, as Table 1 illustrates, the assumption of general literacy for all members of society first came about during the era of print and it is still with us. This brings us to what I feel is the core tension in our current episode of remediation and the biggest challenge facing education: Our new medium presents an extremely complex writing space that presumably takes a long time to master and yet we continue to assume that literacy is an attainable goal for all. Print provided us with a comparatively simplistic medium that naturally facilitated the spread of mass literacy in much of the world. Though we are moving beyond print, most of us are unwilling to give up the goal of true literacy for all rather than for just an elite few. Thus, we are going to have to come to terms with the medium's inherent complexity. This means a devotion of much more time and many more resources to making *all* of our students truly literate in the digital medium. It may even mean reorganizing the curriculum so that specialized subjects are all approached through a central core of digital literacy practices, just as elite students in much of human history before the age of print found that all branches of learning were interrelated because they were held together by a pervasive focus on rhetoric (Lanham, 1993). The rhetoric that our new medium enables demands our attention as educators, and asks to play a central part in all academic activities from elementary to tertiary levels if we are sincere about our goal of mass literacy.

At this point in time, we can safely say that the digital medium is changing our notion of writing and ushering in a new breed of literate practices, although it can be argued that it is not entirely clear yet what skills are most essential for succeeding in this new environment nor how to best prepare students for the challenges that lie ahead. Nevertheless, it is an exciting time to be an educator. If we remember to consider the lessons of history as we move forward and refuse to compromise our educational principles, I believe we stand a fair chance of making decent choices during this turbulent time of remediation from print to digital.

Notes

1) Bolter and Grusin (1999, pp. 40-41) effectively illustrate this tendency to imitate by visually juxtaposing the remarkably similar print and digital versions of a particular day's *USA Today* newspaper.

2) Reflecting on his writing, Wittgenstein addressed his struggle with linearity when he lamented that "… my thoughts were soon crippled if I tried to force them on in any single direction against their natural inclination. And this was, of course, connected with the very nature of the investigation. For this compels us to travel over a wide field of thought [and] criss-cross in every direction" (as cited in Bolter, 2001).

3) For numerous examples of how the intellectual history of the 20th century anticipated our shift to a digital medium, see Lanham (1993) and Tofts, Jonson and Cavallaro (2002).

4) Postman (1992), Birkets (1994), and Shenk (1999) have all written popular books that essentially lament the technological and cultural shift from print to digital.

5) Havelock (1986) discusses their works in detail, particularly Levi-Strauss' *La Pensee Sauvage*, Mayr's *Animal Species and Evolution*, McCluhan's *The Gutenberg Galaxy*, and Goody and Watt's *The Consequences of Literacy*.

6) The visual richness of Egyptian scrolls is to be expected since hieroglyphic characters themselves have not been separated from their pictorial origins as alphabetic characters have.

7) The images in Figures 1, 2, and 3 were retrieved on November 6, 2004 from the following sources:
    Figure 1, left: *http://www.und.nodak.edu/instruct/cjacobs/Herodotus-mummy1.JPG*
    Figure 1, right: *http://www.learn.columbia.edu/insular/works/framesets/kells_fr.html*
    Figure 2, left: *http://www.griffons.com*
    Figure 2, right: *http://www.historicpages.com/texts/lfcat29.htm*
    Figure 3, left: *http://www.learn.columbia.edu/insular/works/framesets/kells_fr.html*
    Figure 3, right: *http://www.konan-u.ac.jp*

8) Masaccio's *Holy Trinity* painting, widely considered to be the first work of visual art to achieve a sense of realism by applying the mathematical principles of one-point perspective, was likely painted between 1426 and 1428.

9) I am thinking in particular of the very recent and immensely popular genre of weblogs. They typically involve one main author (or *blogger*) who writes something and then adds to or revises the original text based on written comments posted by readers.

10) Even the auditory distinction between oral and written genres is gradually weakening as speechification software that reads texts to readers/listeners becomes increasingly popular. This is not to suggest, however, that all the walls between speech and writing are fading away. Writing remains a much more deliberate and self-conscious act than most instances of speech.

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