Prologue to an Object-Agent Theory of Literacy

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The pace of development of communication technologies over the past decade has been remarkable. As a result, literacy as a concept has become a rapidly moving target (Leu, 2000), and new technologies have created possibilities that are at odds with longstanding notions about readers and written language. One of the most significant of these changes is the capacity of online reading materials to engage readers in literal, rather than purely metaphorical, interaction. Currently influential theories of reading based on the work of Rosenblatt (1978) recognize the complex dynamic character of the reading act, “the poem” as she called it, and researchers exploring the application of new literacy technologies are beginning to extend our ideas about how text can be “responsive” (Leu & Hillinger, 1994) or “supportive” (Anderson-Inman & Horney, 1998). Nevertheless, I would argue that even our most forward-thinking theoretical models do not adequately prepare us for the interactive text that is already reshaping literacy online and that there is a need for a fundamental re-evaluation of our understanding of what it means to read.

Drawing on the work of Searle (1969), Rosenblatt (1978) likened reading to the speech act. Unlike a speech act, however, in which two active agents (speaker and listener) transact meaning through the medium of an utterance, in reading there is only a single active agent. In Rosenblatt’s words, “the author has dropped out. Only his text and the reader remain” (p. 20). As a result, “the reader finds it necessary to construct the speaker, the author—the voice, the tone, the rhythms, the inflections, the persona—as part of what he decodes from the text” (p. 20).

In some respects, the assignment of readers to an active role in transacting meaning (the agent role), while written language is assigned a more passive role (the object role) is not surprising. Readers, after all, have attitudes, agendas, objectives, and values that influence their decisions and actions. Written language, on the other hand, has an essential artifactual character. Books, magazines, handwritten notes, and personal correspondence may express attitudes, agendas, and values, but they are not “interactive in the literal sense” (Reinking, 1998, p. 1). This paper focuses on what the phrase “interactive in the literal sense” might mean for us as reading researchers and educators in the years ahead, as readers increasingly go online to read and as authors and programmers increasingly package and disseminate written language in electronic environments.

The specific claim I develop in this paper is that the new literacies fundamentally alter the character of written language (hereafter referred to as text) by transforming it from an artifact into a genuinely dynamic agent capable of interaction in the literal sense, and that this has profound implications for how we conceptualize language users, artifacts
and language itself. Moreover, although some theorists (e.g., Landow, 1992) promote the new literacies as an ally in challenging the independence and authority of text, these literacies can be, and in fact, already are, applied in ways that empower author and text to a much greater extent than they do readers. My claim is that this represents the ultimate challenge we face as reading and language arts educators: to prepare students to be active critical language users in an environment that is far more dynamic than even the most radical theories of text have proposed, an environment where texts become readers, and readers become texts (see Barthes, 1974, p. 10 for another variation on this theme.)

TEXT AS OBJECT

The problematic characterization of text as object is hardly a new idea. Plato (edited by Edman, 1928) considered it in some detail in Phaedrus arguing that the fixedness of written language would promote forgetfulness and distort the essentially dynamic nature of language and thought.

I cannot help feeling, Phaedrus, that writing is unfortunately like painting; for the creations of the painter have the attitude of life, and yet if you ask them a question they preserve a solemn silence. And the same may be said of [written] speeches. You would imagine that they had intelligence, but if you want to know anything and put a question to one of them, the speaker always gives one unvarying answer ... and, if they are maltreated or abused, they have no parent to protect them; and they cannot protect or defend themselves. (p. 324)

Continuing, Plato made the case for the art of rhetoric as founded on a fundamentally interactive model predicated on an understanding of, and a willingness to adapt to, the needs and capacities of the interlocutor. However, because text, as an artifact, is fixed, Plato asserted that written language can never achieve what is most essential in the art of rhetoric.

Current critical theorists have taken a special interest in hypertext and hypermedia, arguing that the new literacies have returned a dialectical element to written language. As in Plato's Phaedrus, however, the argument critical theory offers has its roots in traditional limitations of written language, rather than in the capacities of the new literacies. Critical theorists have pointed out that traditional print is linear, while human thought is not. They have emphasized the structured, hierarchical character of traditional print, and pointed out that this imposed structure may serve the needs of the writer but only constrains the reader in undesirable ways. Related to the idea of an imposed structure is the concept of a central axis of organization that establishes an a priori “center,” regardless of the needs and interests of the reader. Critical theorists have argued that the centeredness and fixity of traditional print marginalize readers, who are obliged simply to accept the text as written, or stand in silence before it, as “there is no way directly to refute a text” (Ong, 1982, p. 79).

Moreover, critical theorists have also argued that these features of text are not necessary and, indeed, are unfortunate and “thoroughly unnatural” (McArthur, 1986, p. 69)
consequences of the technologies of traditional print, that is, the book. They have advocated that we “abandon conceptual systems founded upon ideas of center, margin, hierarchy, and linearity and replace them with ones of multilinearity, nodes, links, and textual networks” (Landow, 1992, p. 2). “What is unnatural in print will become natural in the electronic medium” (Bolter, 1991, p. 143) because hypertext literally embodies poststructuralist conceptions of the open text. “Critical theory promises to theorize hypertext, and hypertext promises to embody and thereby test aspects of theory, particularly those concerning textuality, narrative, and the roles or functions of reader and writer” (Landow, 1992, p. 3).

Despite the insights critical theory has brought to bear on the nature of the reading act, however, there is a conspicuous absence of appreciation for what is most radical in the new literacies: that text itself is recreated as a genuinely active agent in transacting meaning online. Text no longer stands mute and, as viral macros and Internet worms routinely demonstrate, Plato’s worry about text that cannot defend itself and Ong’s irritation with its obstinate refusal to negotiate is only the tip of the proverbial iceberg. Text is no longer confined to an artifactual role in transacting meaning and, until our theories of reading and language begin to reflect this, our conceptualizations of the new literacies will be fundamentally flawed.

**REDEFINING TEXT AND READING ONLINE**

My objective thus far has been to identify a traditional, but now unproductive, assumption of text as artifact that undergirds much of modern theory in reading and language arts. In this section, my purpose is more constructive. My intent is to propose a broader view of text and literacy that subsumes the traditional model, while simultaneously accounting for the new literacies. Ultimately, my objective is to demonstrate that the traditional model of text as artifact is simply a special case of a broader model that acknowledges the capacity of text to assume either a more passive or a more active role as an agent in transacting meaning. Central to this broader model is a definition of text that is grounded in literacy theory, but also consistent with a more narrowly-focused view that draws on technical fields from which the new literacies have emerged.

The term *text* as used in this paper is defined in fairly traditional terms as “a set or series of signs interpretable as linguistic symbols” (Rosenblatt, 1978, p. 12). The utility of this definition within a theory of the new literacies, however, depends in an important way on not making certain assumptions as much as on the definition as explicitly stated. Specifically, in the traditional model, a human agent is presumed to function as the interpreter of the signs, but nothing in the definition excludes non-human interpreters (e.g., computing devices). Second, although the traditional model generally presumes that the linguistic symbols interpreted are from a natural language, there is nothing in this definition that excludes artificial (i.e., programming) languages like those developed for use with computing devices. Although Rosenblatt may not have intended to define text in
terms broad enough to accommodate non-human readers and programming languages, I will argue, as would Rosenblatt (1978, p. 113), that an author’s intentions are not the sole or necessarily the most important criteria for warranting an assertion about the meaning of a text (Rosenblatt, 1994, pp. 1078-1079.)

Rosenblatt’s definition of the term text is somewhat narrower than current usage in the English language arts, because it focuses specifically on written language and makes no reference to “non-print texts” (NCTE, 2000) and “performances” (Wade & Moje, 2000), but this turns out to be another element that makes her definition useful in the present context. Although non-print text, oral texts, and performances may be productive in supporting new ways of thinking about literacy, written language has a place in our thinking about literacy theory and practice that deserves special attention. Moreover, Rosenblatt’s specific focus on written language has the added virtue of compatibility with more technical definitions of text currently in use in disciplines that created the technologies that led to online literacies. Specifically, Rosenblatt’s definition of text fits rather well within a larger technical framework provided by the Extensible Markup Language (XML 1.0), developed by the World Wide Web Consortium (W3C) for universal exchange of electronic data and text on the web, (W3C, 2000), to which I now turn.

The XML Framework

XML provides a suitable technical foundation for the present work for three reasons. First, XML is a generalization of the HTML standard now widely employed on the web, and so, it provides a familiar context. Second, the XML framework is simple to understand and use (Bosak & Bray, 1999). Third, XML is both the heir apparent to HTML and the foundation for, or involved in, virtually every web development initiative now underway, including the W3C semantic web project (Berners-Lee, Hendler, & Lassila, 2001) seeking to define a framework for a common human-machine semantics that will make the concept of text as agent central to the design and deployment of web-based materials.

In the XML specification, a fundamental concept is that of a document, which can be taken to represent any written work ranging from a single word to a multi-volume encyclopedia. The content of an XML document, however, consists of two distinctly different kinds of text: character data and markup. Character data refers to the natural language content of the document and is intended for human readers. Markup, on the other hand, refers to elements in the document that are not actually displayed on a reader’s computer screen. Moreover, while markup elements may have an informal interpretation (e.g. \(<\texttt{H1}>\) = “level 1 heading”), markup is intended primarily for reading by a non-human reader, that is, a computer.

Ordinary web pages provide a good illustration of this distinction. Web pages typically include significant amounts of natural language content (i.e., character data). Although written language displayed on a web page can be delivered as an image file, the most efficient means to communicate in writing is through the use of character data cre-
ated at a keyboard. However, character data is only a part and, as will be demonstrated below, sometimes only a small part of the information that is actually embedded in a web page. The presence of markup becomes immediately obvious if the full text of the page is displayed by viewing the page source (by clicking "View", and then "Source" in Internet Explorer, or "View", and then "Page Source" in Navigator.)

When a web page is viewed as a source file, markup tags, scripts, comments, and other machine-interpretable information often dominate the display. Some of the markup included simply determines display qualities (e.g., bold characters, font sizes, etc.), but markup is capable of far more than specifying display. In fact, one central element in the XML specification is an explicit effort to shift emphasis away from display qualities back to the logical structure of documents, and this is the point at which the capacity of text to transact meaning takes on special significance. The emphasis in XML on a common framework for coding the logic of both artificial and natural language content and the ongoing effort to promote this approach to web development in the W3C semantic web initiative (Berners-Lee, Hendler, & Lassila, 2001) means that even the natural language content of a web page will, in the near future, be machine interpretable.

Perhaps, however, the situation I describe in which two distinctly different kinds of agents, a human and a text, engage in transactions characteristic of the new literacy seems far-fetched or speculative in the sense that, if it ever really does occur, it will be years from now. I would argue, however, that this reality has already overtaken us and this makes the inadequacies of our current models of text and reading all the more serious, and the need for new models even more urgent.

A STUDY OF MARKUP AND CHARACTER DATA AT CNN

One of the places on the web I visit with some regularity is the CNN site. It is a mainstream site that represents established (rather than cutting edge) technology. Although far more sophisticated that a personal web site, the home of CNN on the web focuses primarily on presenting information rather than attempting to promote the high levels of interaction characteristic of e-commerce sites like Amazon.com. If it can be shown that a mainstream site like CNN.com that does not explicitly set out to interact with readers still makes a priority of a more implicit kind of interaction, it can reasonably be argued that we would be unwise to think online text continues to assume the passive role we assign to traditional print. The questions addressed in this study are straightforward: 1) What is the proportion of markup to character data on the CNN web site?, and 2) Does the markup appearing on this site provide any direct evidence that the site intends to promote user interaction, or is markup employed primarily in support of formatting and display?

Data collection was as straightforward as the questions. The CNN site consists of one main page and 15 sub-pages that reside either within the CNN site or on a CNN-affiliated site, such as the CNN sports link that opens the CNNSI Sports Illustrated site. I
opened each of these 16 pages in a web browser, copied all of the text I could by clicking and dragging my cursor from the top to the bottom of the page, and then pasting the text I had copied into a word processor as unformatted text. I then used a document statistics function to assess the number of words and characters in each page. I was, in effect, measuring character data because only character data is pasted into the document using the "unformatted text" option.

After assessing the character data on each page, I went back to the CNN site and saved a copy of the complete web page, that is, the source file, to my hard drive as a text file. I then opened this file in my word processor and once again did a word and character count, but this time instead of counting character data alone, I counted all of the text in the page, both character data and markup. Determining the word and character count of the markup was then a simple matter of subtracting character data totals from my overall totals.

I also did two final counts examining each of the 16 CNN pages for two tags associated with user interactions that require application processing (as opposed to simple browser display) by either the client computer (i.e., the user's computer), the server computer, or both. One of the tags counted was the <form> tag, required for users to submit data to a server, and the second was the <script> tag that requires a processing response from the client, the server, or both.

Results of the analyses are displayed in Table 1. When counting words, that is, letter strings bounded by spaces, the ratio of markup to character data varies from a low of 1.75 to a high of 5.6, with an average of 3.58 across all pages. A higher ratio of markup to character data is evident in character counts, a result due to the fact that markup "words" (e.g., URLs) tend to be longer than natural language words. The appearance of <form> tags on CNN pages ranges from a low of 4 to a high of 20, with an average value of 10 forms per page. Appearances of the <script> tag are a bit less frequent, ranging from a low of 2 to a high of 12. On average, there are about 7 appearances of the <script> tag on each CNN page.

**DISCUSSION**

The data reported here make a compelling case for the argument that at least as much, and probably more, of the text on each CNN web page is intended for another computer, rather than a human reader, despite a relatively low emphasis on reader interaction compared to mainstream e-commerce sites. More than three quarters of the "words" in an average web page at CNN are never displayed on a human reader's monitor. Character counts reflect the same general pattern. And when two tags associated with client or server application processing, such as <script> and <form>, are counted, there is an average of 17 appearances of these two tags on every CNN web page.

It is relevant to note that there are limitations to consider, one of which has been alluded to previously. Although character data is the most efficient way to include written
language on a web page, it is not unusual for written language to be embedded in an image file that is part of a page. This is a common method of generating labels within navigational banners, buttons, and image maps, and it has the effect of driving up the MU:CD ratio on a web site. A case can be made, however, for excluding written language in this kind of context (i.e., within a navigational banner) because fixed navigational support elements function more like meta-text (e.g., indexes, glossaries, tables of contents, etc.) than they do as content. However, potential influences on the MU:CD do not operate in one

<table>
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<th>Comparison of word, character, and selected tag counts for 16 CNN site pages (<a href="http://www.cnn.com">http://www.cnn.com</a>) based on 7/17/2001 postings</th>
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direction only. The CNN site, like many others, uses server-based scripts that leave no trace of the programming that created them, resulting in underestimates of the actual MU:CD ratio. Limitations that should be considered, therefore, do not consistently over- or underestimate the MU:CD ratio.

The point of this study however is not to assess the CNN Web site or generalize to the web as a whole. Rather, my intent is to illustrate in a concrete fashion that what we see as readers when we are on the web is only a part of the story. Although we tend to think of web sites as simply delivering information to us, there is another completely different audience, that is, other computers, that has a significant role in the meanings transacted online. Indirect evidence such as the MU:CD ratio suggests that computers are at least as important an audience for web pages as we are, and direct evidence based on the use of interaction-oriented markup tags suggests that interaction with readers is a priority, even on a site designed to adhere to a fairly traditional news distribution model. This, I would argue, is the foundation of the theoretical dilemma we face in the language arts and the source from which a broader theory of reading and language arts pedagogy must build. Interactive text is rapidly assuming great significance in online reading environments, but our theoretical models are ill-equipped to accommodate this change.

Text as Agent

Given a long tradition of text as artifact, the concept of text as an active agent in the transaction of meaning requires a realignment that may not be easily achieved, despite even the most compelling theoretical analyses. If that is the case, it may be more useful to consider some very practical issues related to the concept of text as agent. Over the past year, for example, a number of email viruses have spread widely enough to be reported in the popular press. Some of these viruses attempt to open email address books and replicate by sending copies of themselves to entries found in compromised address books. Less virulent examples simply post a prankish message to a user's monitor or email system, while more virulent forms may do serious damage to a computer. Less obviously intrusive, and indeed even useful, examples include the widespread use of cookies, a common way that Amazon.com, for example, keeps track of what interests shoppers, and web sites that tailor content and/or presentation of web pages by reading users' hardware and software configurations.

Despite the potential impact of each example noted above, however, these agents have a limited understanding of the texts with which they transact meaning. Although the Amazon.com agent uses information about the items I have viewed and purchased and the email virus acquires and applies information about the people with whom I correspond by email, this learning is only marginally related to the content that is of interest to me as a reader. The focus of a human reader is on the natural language that is delivered to my browser and, until now, that content has been largely inaccessible to machine readers. However, as noted by Berners-Lee et al. (2001), there is good reason to believe that this
will change over the next few years as more web-based materials begin to include semantically coded XML. The remarkable power and ubiquity of online databases is testament to the potential of more genuinely interactive text, but even this capacity will pale against text that can apply what it learns both from databases and semantically coded natural language content.

In order to account for the kinds of meaning that will be transacted online, we will need to reconsider the traditional assignment of roles in the reading act. Text can no longer be assigned the role of object by default. Human readers, even while they transact meanings on one level, may well serve as a machine reader's text on a different level. And, attempts to restrict the role of interpretant to human agents by appeal to human authorship will not hold up much longer. Even today there are text agents, often based on large databases, that learn on the basis of their interactions with users and, as a result, are capable of interpretations that were never strictly coded in their original design. Moreover, the text bases of the near future will not even require interaction with users to learn because semantic coding of web pages will make natural language content machine interpretable. Coupled with sophisticated search algorithms designed to help map the web (Kumar, Raghavan, Rajagopalan, Sivakumar, Tomkins, & Upfal, 2000), a text base could develop its own unique understanding of the web or any subject represented on the web that could prove as useful as one developed by human readers.

Pushed to its logical extreme, text as agent becomes an artificial intelligence in the sense that Alan Turing (1950) defined it. Briefly, Turing proposed that a machine should be considered “intelligent” if a human, using only text-based interaction, could not distinguish it from a human being. In effect, Turing proposed that language competence serve as the basis for defining intelligence, much like René Descartes (1637, 1984) more than 300 years before him. Some argue, however, that behavioral competence cannot be considered equivalent to understanding, in the sense that humans understand, and John Searle, one of the most notable of such critics presented in support of this position what has come to be known as the “Chinese room” argument (Hauser, 2001).

Briefly, Searle (1980) suggests we consider a situation in which a person sits alone inside a room. On one side of the room is a narrow slot through which scraps of paper with Chinese writing are submitted. Within the room, a set of reference materials allow the person inside, who does not speak Chinese, to generate a plausible Chinese response that is then pushed out the slot on the other side of the room. Searle contended that even if linguistic competence is granted, that is, even if the person in the room has the resources needed to generate plausible Chinese responses, it is abundantly clear to that person that s/he does not understand Chinese, but that s/he is simply executing a mechanical (i.e., syntactical) algorithm. Searle’s claim is that, while behavioral competence is necessary, so is the intentional conscious state experienced by someone who understands Chinese.

Searle’s insistence on specific internal states seems far less compelling, however, in less abstract situations in which the limitations of his variation on mental/behavioral dualism become apparent. These limitations are brought into particular focus by his response
to a systems-based criticism that the person in the room is only one element in a larger system and therefore need not understand in the first-person sense (Hauser, 2001). Searle’s response is to allow the person in the room to internalize the symbol conversion system by memorizing all the materials and steps involved in generating responses. He suggests that the person who does this will still experience the same intentional state of not comprehending the writing, and, significantly, he once again affirms the privilege of the first person account.

A more pragmatic approach to this situation, however, underscores that what Searle perceives to be “common sense” has some rather surprising implications. The person who has internalized the Chinese room now interacts with Chinese-speaking people “as if” s/he understands and speaks Chinese fluently. Every response is plausible and well formed. However, if we now inquire of that person whether s/he understands Chinese, s/he responds, “No” (according to Searle, at least), a response that is anything but plausible. Notwithstanding our observation of flawless interaction with Chinese speaking people, s/he continues to insist that s/he does NOT understand Chinese. What kind of sense can we make of this? Is the assertion of an individual based on a private, privileged state to be taken at face value? What should be the response of everyone else to the claim by this individual that s/he does not understand Chinese? What would be your response? As long as we are admitting privileged states we might as well appropriate some of our own.

Despite Searle’s attempt to enthrone first-person introspection and clothe its privileged assertions in common sense, it seems clear that any social use of language requires grounding beyond purely internal states. Someone who converses with Chinese-speaking people while simultaneously claiming not to understand Chinese will quite reasonably be judged a liar, or deluded. Perhaps more importantly, from the perspective of a language community, do private intentional states, real or fabricated, matter more than the public meanings that are produced? To hold that private states take precedence over public interpretations, however, is contrary to the kind of practical issues we must be prepared to deal with in considering reading and the transaction of meaning. Here, as before, Rosenblatt’s foundations in pragmatic thought prove immensely useful. It is not enough simply to assert, assertion must be warranted (Dewey, 1938, p. 9), and the community has a vital role in defining what is and is not warranted.

Although the concept of text as reader may strike us as unfamiliar, this idea is a natural extension of the commitment we make to a pragmatic, non-dualistic view of meaning and those transactions that lead to it in reading. A principled approach to defining who or what may transact meanings requires more than a convenient dualistic partition of the world into mental and physical states that may or may not be attached to objects. Moreover, just as warranted assertability ensures that personal interpretations do not spiral into utter relativism, it also ensures that criteria can be established and judged by a language community. Ultimately, a pragmatic orientation obliges us to recognize that Turing’s proposal can be applied and evaluated by a language community in ways Searle’s cannot. If the Chinese Room has any relevance in an argument about the plausibility of
text as agent, I would argue it is simply as an example of dualism’s inadequacy in our effort to define the kinds of meaning that result when readers meet texts.

SUMMARY AND CONCLUSION

This paper has focused on an assumption that is central to modern theories of text and reading. Briefly stated, this assumption is that while reading involves a transaction, the roles assigned to written language and human reader are usually that of object and agent, respectively. Emerging technologies related to online reading environments, however, refute this assumption by enabling documents to assume very active roles in managing and shaping reading transactions, leaving scholars and practitioners of literacy struggling to reconcile these new online literacies with more familiar examples from our long print tradition. Ultimately, my claim is that the new literacies have revealed flaws in our conceptualization of reading and language arts that are deeper and more serious than we might want to acknowledge, calling for a reappraisal of our foundational assumptions, rather than simply adding concepts to our theoretical toolbox.

Moreover, I have tried to make the case that the conceptual flaws I have noted are not simply a matter of theoretical polemics. I have tried to bolster the practical significance and immediacy of my position by demonstrating how one current widely used website (http://www.cnn.com) distinguishes and targets both human and non-human agents, even though it has not been specifically designed to promote interaction, as would, for example, an e-commerce site. Given this, I would argue that the notion of text as agent is not mere philosophical speculation but a very real issue that has important implications for reading theory and practice in online environments. Finally, I have tried to address a position articulated by Searle (1980) against the notion of an artificial intelligence that could be taken as a critique of the text as agent idea. My approach has been to emphasize the essentially pragmatic foundation established by Rosenblatt (1978) that undergirds much of modern reading theory. Such a foundation requires us to reject the dualism that is central to Searle’s argument of privileged introspection and addresses problems of relativism through fundamentally empirical and social processes that warrant claims (Rosenblatt, 1978; Dewey, 1938, p. 9), whether these are intended as scientific pronouncements or literary interpretations.

In closing, I suggest that the impact of the questions and issues raised by our new electronic literacies are difficult to overstate because the need for theoretical reappraisal reaches down into the very roots of our thinking about readers, text, and meaning. The disciplinary innovation required is of a type that may well transform the fields of literacy and language arts in ways that we cannot anticipate or control.

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