

Media and online literacy studies

A

s with any collaborative writing project, this New Directions in Research (NDR) piece, *Media and Online Literacy Studies*, has an interesting history. When we invited Margaret C. Hagood, Kevin M. Leander, Carmen Luke, Margaret Mackey, and Helen Nixon to participate in the project, we asked them to respond to a series of questions that we had brainstormed as possible starting points. Following a round of e-mail exchanges in which the NDR authors responded to these questions and raised issues that were integral to their own work on media literacy and online literacy studies, we asked them to frame their individual contributions around the following issues:

- What theoretical or disciplinary perspectives might facilitate moving the field forward in studies of media and online literacies? That is, where do we need to be headed in terms of research on this topic?
- Is there a need for specialized methods or tools for collecting and analyzing data in studies of media and online literacies? Why or why not?
- What are the cultural, political, and economic policies in your respective parts of the world that are influencing how practitioners might respond to research on media and online literacies? That is, who would care if you did (or did not) inquire into this topic?

The NDR authors shared their initial drafts with one another and with us, addressed various points that needed clarifying, and then wrote their final drafts. In a subsequent series of e-mail exchanges among the authors and editors, it became apparent that there was interest in offering a parallel, but elaborated, version of this particular NDR feature through RRQ Online. The hypertext/hypermedia capabilities of RRQ Online allow the current NDR authors to link to the Web and to expand the ideas they generated in the printed piece. The elaborated version, along with the authors' e-mail discussion, is available through RRQ Online Supplements, at http://www.reading.org/rrqonline/supplements/38_3/.

Donna E. Alvermann and David Reinking

New media and online literacies: No age left behind

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Issue 1. Who is affected by new media and online literacies?

Research addressing the uses of new media and online technologies is often situated in relation to youngsters' lives. It's not uncommon to read about a 2-year-old's interaction with computerized storybooks (Smith, 2001) or a 5-year-old Web designer (Lankshear & Knobel, 1997). Documentation of elementary school age students' text uses runs the gamut from their own video productions (Grace & Tobin, 1998) and online research inquiries (Owens, Hester, & Teale, 2002) to development of computing skills in conjunction with writing in literacy centers (Labbo, 1996). From literacy practices involving rap music (Hagood, 2001) to instant messaging conversations (Lewis & Fabos, 2000) to the creation and negotiations of Web texts in computer labs (O'Brien, 2001) and the world of online gaming (Katz, 2001; Turkle, 1995), adolescents have also been studied to learn about how they incorporate media into their repertoire of literacy. These are only a few examples of a growing body of research focusing on youngsters' media and online literacies. Across such writings, implications continuously call for adults' attention to youngsters' burgeoning literacies so as to make education more relevant to students' lives, to develop productive citizenry, and to motivate struggling readers.

Though these implications are indeed important for focusing on new communication technologies in today's media-saturated world, what is often ignored is the import of media and online literacies in our own lives and to our identities as researchers, teacher educators, and adults. In other words, not only is it important to examine the role of new media and online literacies in youngsters' lives, but it is also crucial, I believe, for reading researchers and teachers to be interested in media and online literacies because

these literacies affect us, too. For instance, teacher educators must consider media and online literacies in the courses they teach. Textbook adoptions involve more than just choosing a primary text for class instruction. They now often include interactive CDs and linked websites to enhance learning and availability of information. Web CT, PowerPoint, listserv discussions, video productions, instructors' websites, wireless Internet connections, and Personal Digital Assistants (PDAs) also affect classroom instruction, interaction, and text use among teachers and students in colleges and universities.

Researchers too are affected by new media and online literacies, which inundate their work. Comprehensive database searches, access to virtual online communities, e-mail dialogue journals with collaborators (other researchers or participants), and new media tools such as voice-recognition software that organizes data and tracking devices that show edits in text writing are just a few examples of the ways that new technologies have changed reading researchers' work, both in *what* they research and *how* they research it.

Because new media and online literacies are part and parcel of our day-to-day lives, reading researchers and educators need to begin to view them as a central aspect of literacy research. This means that new media and online literacies can no longer be considered only what youth "do" to the exclusion of what adults "do" or as an "add on" to the field of reading (e.g., an extracurricular topic to be explored in schools or studied in research if and when time allows and only after "real reading" takes place or as a "hook" to engage disinterested students in school-based literacy practices). New media and online literacies belong to and affect people of all ages. These literacies and their related practices should be recognized as literacy venues that have evolved concurrently with broadened definitions and understandings of terms such as *texts* and *reading* in the

field of reading and in relation to other disciplines that study reading behaviors, including media and communication studies and cultural studies.

Issue 2. Affecting the researched and the researcher

Indeed, the functions and forms of media and online literacies are propelling changes in the ways that research is conducted. Overall shifts in theoretical perspectives regarding audiences' uses of texts as well as data-gathering capabilities inherently available within media and online texts themselves have potential to generate new directions for research and new forms of data in these areas. A long-standing area of research addressing audiences' text uses in other fields has influenced many reading researchers interested in media and online literacies (cf. Hall, 1980; Hoggart, 1958; Willis, 1974). Audiences' engagement of texts in new and different ways has pushed the concept of *active audiencing*, which calls into question transmission models that position readers as passive receivers of information and meanings marketed toward particular audiences. Reading researchers who draw upon theories such as reception theory, poststructural theories, or cultural studies have begun to view audiences as their own creators of text uses rather than as solely recipients of predetermined and produced media messages (cf. Alvermann, Moon, & Hagood, 1999; Buckingham & Sefton-Green, 1994; Fisherkeller, 1997; Tobin, 2000). These theoretical frameworks as situated within a larger perspective of media literacy reiterate the notion that the meaning of a text is not transparent but is constantly in movement and dependent upon readers' *uses* of texts. Given the emphasis on *uses of texts* rather than on *meaning of texts*, Ang (1996) noted that "fundamental uncertainty" erupts from efforts to determine textual meaning. As she explained, "communicative practices do not necessarily have to arrive at common meanings at all" (p. 166). Situating their work within a framework of multiple realities, Labbo and Reinking (1999) discussed similar open-ended possibilities of post-typographic texts, which add to the complexity of understanding how readers use texts to make sense of their worlds.

The emphasis on text uses over text meaning is significant for reading research. By acknowledging that users are not passive recipients of media messages, researchers interested in media and online literacies have begun to view users differently. Because

readers actively engage in their text uses, researchers have become interested in the ways that readers use texts differently. Some researchers have begun to focus on the readers' innovations for creating new ways of being, new constructions and notions of themselves, while simultaneously being produced as a particular kind of person based upon their text selection.

In short, the shifts toward views of media and online texts as dynamic and indeterminate have forced researchers to begin to examine *both* production and consumption of texts in order to understand better how media and online literacies assist readers to facilitate particular ends. Discussions of production and consumption of media text are often central to the work of media and cultural studies (Lusted, 1991; Storey, 1998). Johnson (1987) theoretically outlined how production and consumption play out for audiences. Explaining the "circuit of production and consumption," Johnson noted that "the circuit is, at one and the same time, a circuit of capital and its expanded reproduction and a circuit of the production and circulation of subjective forms" (p. 47). This quotation as it applies to those interested in reading research calls attention to the circuit of communication in literacy: The meanings made of and from new media and online technological texts within the circuit must account for the ways that readers both shape and are shaped by those texts.

The perspective that texts have no meaning and are indeterminate until readers ascribe uses to them will affect the ways that research is conceptualized in the areas of new media and online literacies. Researchers interested in the active audience and conscientious of the circuit of production and consumption must foreground readers' ongoing construction of meaning and move away from an *assumption* of transparent textual meaning (of the text acting upon the reader). Certainly connections between reader, text, and context as noted by Mackey, Leander, and Nixon (later in this issue) will be paramount to such research endeavors and will render glimpses of readers' media and online text uses. However, central to these investigations from critical perspectives, researchers need also to consider how readers use texts as cultural capital and as a means to appeal to particular identities, to subvert and change identities, and to construct new subject positions for themselves. A focus on the production and consumption of texts might include studies that investigate both the marketing strategies employed to create texts according to audience demographics and interest criteria gleaned from focus group input

(see <http://www.look-look.com>) and the audiences' self-created uses of texts unintended by marketers. These studies of production and consumption necessitate researchers' attention to the circulation of power among readers, as readers actively construct uses of text while they are concurrently being "produced" with particular identities. I imagine that new uses of media and online literacies will be documented and novel directions for reading research will germinate in this multidimensional virtual space where readers engage tactically and peripatetically, explicitly and tacitly, and where they are simultaneously produced with certain identities and construct uses of texts for and of themselves and others.

Layered data collection and analyses that dissect the reader, text, and context in the larger circuit of production and consumption are noteworthy to researchers interested in active audiencing. Albeit time consuming, multileveled and detailed analyses that concentrate on readers' shifting notions of themselves and others might move the field into new conceptualizations of the researcher and researched, of the teacher and student, and of assumed generational demarcations of readers' media and online literacy text uses. Detailed analyses of readers' text uses across contexts illustrate the tensions that result from being produced as a particular kind of person based upon one's assumptions about particular texts and from readers' own constructions of self that contradict the identities produced for them (Hagood, 2002). Analyses that focus on readers' uses of texts within the circuit of production and consumption may aid in reformulations of identity formation and of constructions of self that reveal how audiences' uses of texts shift and change instantaneously dependent upon their purposes. Such research needs to address an array of multiaged readers in various contexts using texts with different audiences (see Hagood, Stevens, & Reinking, 2002, for case study comparisons of multiaged readers). By forcing close examinations of text uses across generational users, researchers will begin to document how the circuit of production and consumption plays out among readers of various ages.

Furthermore, researchers who attempt to explore research questions that address how new media and online literacies affect youngsters' constructions of identities and notions of self need also to apply such questions to themselves as they engage these same media technologies in their lives. If researchers do not recognize how new media and online literacies affect notions of themselves and their perceptions of others, then they will unintentionally reify the effects paradigm, which implicates youngsters as

susceptible to media and online literacies to the exclusion that these very literacies also affect all users—without age discrimination. Lack of acknowledgment of the ways that media and online literacies affect users across ages (both the researched and the researcher) weakens researchers' arguments that audiences are active in their text uses. Furthermore, different conceptualizations of readers' text uses (as active audiences) and attention to text uses across age groups will also affect how research on new media and online literacies will be conducted. Research study implications will serve applicably toward all age levels and groups of readers, rather than as suggestions by adult researchers made for the benefit of the young and researched. Ultimately, it is not enough to focus only on the reader, the text, and the context. The trio needs to be conceptualized in a multidimensional fashion as they play out in a larger sphere of production and consumption as audiences choose and use texts.

Issue 3. Conceptualizing the medium in the media

Aware of rapidly evolving technological advances that have forced us to become readers of printed text, signs, and imagery, literacy educators have begun advocating for and researching an expanded notion of text that extends beyond traditional print-based reading and writing. These more expansive views of *text* and of *reading* have in the past decade or so become more central to the field of reading research and literacy studies. Resulting from a broadened conception of what counts as text (Flood & Lapp, 1995) and what is considered reading (Kamil, Mosenthal, Pearson, & Barr, 2000), reading researchers have begun to develop areas of study concerned with expanded definitions of literacy. Multiple literacies—including school, personal, and community literacies (Gallego & Hollingsworth, 1992, 2000) and visual forms of communication (Flood, Heath, & Lapp, 1997; Hobbs, 1997)—have been conceptualized in a variety of ways, as new literacies (Bruce, 1998), multi-literacies (Cope & Kalantzis, 2000; New London Group, 1996), digital literacies (Alvermann, 2002; Sefton-Green, 1998), and new media and popular culture (Alvermann et al., 1999; Buckingham, 1998; Howard, 1998).

New media and online literacies might seem like an innovative area of study. Yet previous work conducted in the broader fields of media studies,

mass communication, film, and cultural studies (Kellner, 1995; McRobbie, 1994; Redhead, Wynne, & O'Connor, 2002) has paved the way for the directions literacy researchers are attempting to take in this area. New media and online literacies that encompass communicative media and popular culture such as television, the Internet, or music, for example, have been readily accepted and used within the field of media studies and cultural studies research. Until recently, however, this broadened definition of text and of literacies has been excluded from the field of literacy research (Kamil et al., 2000). Only within the past 10 years has a wider description of literacies been accepted in reading research. This wider conceptualization has resulted in research about technological media (Leu & Kinzer, 2000; Reinking, McKenna, Labbo, & Kieffer, 1998), readings of multiple sign systems (Hamilton, 2000; Tierney, 1997), and experimentation with visual literacies (Messaris, 2001; Whipple, 1998). *Reading* within literacy education has come to be conceptualized within a multimedia environment (Adoni, 1995; Bruce, 1997).

Although views of literacies as plural and contingent upon various text media and contextual use seem to be catching on in the field of reading research, definitions of literacy that are broader than reading and writing (and speaking and listening) and culturally and contextually bound (Barton, Hamilton, & Ivančic, 2000) are still contested terrain (Street, 1999). Much work still lies ahead for reading researchers and teacher educators. If researchers within the field of reading plan to make significant contributions to research on media and online literacies so as to influence other fields (e.g., mass communication, film studies) then the notions of reading and text defined broadly within the 21st century must become an underlying premise of our work rather than one for which we must continually argue.

Issue 4. Crossing fields and media

Discussing differences between a traditional definition of text and literacy and a newer formulation of texts and literacies, Sefton-Green (1998) declared,

Indeed, interacting with a game or other digital texts, from CD-ROMs to online World Wide Web sites, is qualitatively different from the relations between reader and writer in the domain of print literacy.... If a fixed relation between writer

and reader is the hallmark of the old literacy then an interactive dynamic is at the heart of the new literacies. (p. 10)

Old and new perspectives regarding literacies need to be studied and shared in interdisciplinary ways. Bound up in this molding of old and new perspectives of literacies are issues of user/reader/producer/consumer identity and subjectivity, which are tied to "old" and "new" assumptions of types and forms of literacy as well as to assumptions that others hold about users and how users see themselves. In order to move the field of reading research forward, researchers need to examine the ways that old and new ideas merge and clash across contexts. It is important therefore to examine both the production and consumption of media and online communication of all users—not just of youth. In an age when adults and youngsters are concurrently learning how to use new media and online technologies, research on the topic needs to address multiple perspectives of users and uses. Such study entails the use of various theoretical perspectives like the coupling of cultural studies with media studies and poststructural theory, for example. Taking on mainstay ideas about singular models of media and literacy from different disciplinary studies may assist in rethinking forms of production and consumption that acknowledge readers' diverse text uses.

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Writing travelers' tales on New Literacyscapes

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Unbounding Internet culture and identity

While walking through the city, you might come upon chalk marks on the outside of a building that look something like a large version of this:)(, with letters and numbers written adjacent to them. These symbols are giving you information about how to tap into a wireless local area network (WLAN) based inside that building; someone has "warchalked" the building so that you may open up your laptop or Personal Digital Assistant (PDA) and piggyback on a high-speed network supported by a business or building resident. This literacy practice is said to have its historical precedent in the marking of buildings by beggars and the homeless during the Great Depression in the United States, who used chalk marks on the outside of buildings to indicate whether or not they were good places for handouts (<http://www.warchalking.org>).

I begin with the example of warchalking not because of the ethical issues that dominate discussions of it, but because I believe it illustrates several key issues that will become increasingly critical in emerging research on online literacies. First, the writing on the outside wall concerns the digital world and gives information about it, but does not formally exist inside the digital world. Rather, information about a WLAN flows onto a traditional urban sketchpad: the building. Online and offline "worlds" flow and fuse; literacy is a traveling practice (Clifford, 1992) within and between them. It is increasingly less tenable to hold onto a vision of culture, identity, and literacy practice in which the "offline" and the "online" are held radically apart in the ways that they are practiced and signified (Hine, 2000; Miller & Slater, 2000). City buses, television shows, and cereal boxes announce websites to youth audiences, friendships are mediated through physical

classroom spaces followed up by daily instant messaging (IM) sessions, hit movies are first experienced through Web-based trailers, and the Internet is realized in cultural practice and is reified as a cultural artifact in the media (Hine).

Second, warchalking is essentially a practice of rewriting modernist spatial boundaries and calls for a spatial interpretation. On the one hand, the warchalk etchings indicate something of the flow of culture and connectivity in a network society (Castells, 1996), while on the other they suggest how individuals and social groups are constantly engaged in efforts to territorialize space or claim spaces (Massey, 1998). Struggles over technoliteracy spaces have often been narrowly constrained by discussions of material access to computers and networks. While material access is clearly at issue in this example, as much at stake are social, learning, and political issues—provisionally networked social spaces—that make such access desirable and possible.

Third, the practice of writing the warchalk is a practice of identification with other humans and with technology. This marking of identity is invisible to some and well known to others. The warchalk discursive practice participates as part of a freenet Discourse (Gee, 1990) about Wi-Fi (Wireless Fidelity), an anticorporate, quasi-anarchist set of ideologies and practices. Zealous Wi-Firians recruited by this Discourse share not only some type of technical know-how but also powerful practices of "technoliteracy" (Lankshear & Snyder, 2000) that function as forms of identification.

Fourth, and directly related to the discussion of identity, knowledge about information and communication technologies (ICTs) is unevenly experienced and distributed among adults and youth. It is essential to note that the website on warchalking I referred to was created and is managed by 15-year-old Aaron Swartz, a self-proclaimed "teen-age writer, programmer, and hacker" (<http://www.aaronsw.com>). Swartz,

who spends much of his time reading and programming and has been interviewed by the British Broadcasting Corporation and National Public Radio, writes in his website that he occasionally goes back to his old school “to say hello to everyone.” While Swartz is obviously an atypical young person, the noticeable gap between his everyday literacy practices and those of adults, including those of us who teach and engage in research on literacy, may in fact be typical (Knobel & Lankshear, 2002; Tunbridge, 1995). As teachers and researchers, we are currently confronted with the need to observe and learn from our students while making critical decisions about the kinds of old and new literacies that could make schooling meaningful to their life trajectories beyond it (Gee, Hull, & Lankshear, 1996).

Early mapping of digital youth spaces

Margaret Mackey argues (later in this issue) that we need “thick description of interpretive acts, thick analysis, and thick theorizing” (p. 405), with a particular emphasis upon research that pays attention to the full range of multiple contexts in which persons engaged in semiotic activity are situated. This claim is particularly applicable to the study of online literacies. A handful of large-scale studies (such as the Pew Internet and American Life Project) has collected survey data on the online practices of youth (e.g., Lenhart, Simon, & Graziano, 2001). Some of these studies have been commissioned by corporations with a clear investment in demonstrating the importance of online practices (Roper Starch Worldwide, Inc., 1999). While some interpretive work has examined online literacy practices within diverse school settings (Lankshear & Snyder, 2000; Reinking, McKenna, Labbo, & Kieffer, 1998; Warschauer, 1999), relatively little work has closely documented the everyday online literacies in which many youths invest their time. With few exceptions (Alvermann, 2002; Evard, 1996; Lam, 2000; Leander, 2003; Lewis & Fabos, 2000; Tobin, 1998), current qualitative work has tended to focus upon the products or artifacts left behind by youths in their forays across cyberspace (Leonard, 1998; Stern, 1999; Walker, 2000). From this perspective, the current state of the field is somewhat analogous to composition studies in the early 1980s, when researchers first began to systematically observe and study writing processes in situ rather than to examine textual

traces alone. Moreover, with few exceptions (Holloway & Valentine, 2001; Kupperman & Fishman, 2002; Lankshear & Knobel, 1997; Valentine, Holloway, & Bingham, 2000) very little work has considered how home and community settings interact with online practices, producing the kinds of interpretations of online literacies that have been more richly documented for other out-of-school practices and settings (Hull & Schultz, 2001). Such research across diverse settings will help make evident the need to shift our questioning from *what to do* with technology in school toward redesigning the relationships between the school, the home, and the community (Bigum, 2002). Integral to these redesigned networks is an expanded perspective of literacy practice as textual, visual, audio, and tactile design.

Current work in social and cultural geography is beginning to generate important insights for interpreting online literacies. Empirical and theoretical work that articulates technology, discourse, and geography considers how information and communication technologies (ICT) practices construct their meanings from the interactions and transformations of multiple social spaces, including the diverse spaces of the Internet (Crang, Crang, & May, 1999; Dodge & Kitchin, 2001; Hine, 2000; Saco, 2002; Wakeford, 1999). Spatial theory is only beginning to be taken up in literacy research (Hagood, 2001; Hirst, in press; Leander, 2001, 2002; Moje, 2000; Sheehy, 1999). This shift is particularly important for researching online literacies, as a limitation of previous research has been the radical isolation of online activity from material settings. Once online activity is bracketed from the social situations that shape its meaning, critically important problems of literacy practice, context, and identity become opaque (Bruce & Rubin, 1993). As an illustration, the research of Sarah Holloway, Gill Valentine, and collaborators (Holloway & Valentine, 2000, 2001; Valentine & Holloway, 2001; Valentine, Holloway, & Bingham, 2002) has reconceived the problem of ICT access to include a consideration of social identity and agency. Across home and different school settings, Holloway and Valentine (2001) have documented practices of identification with technology by youth, including how they negotiate the visibility of their technical competence. For instance, they found that technology emerged as a signifier of social inadequacy for some boys in school (e.g., marked as “geeks” or “homos”), yet skills in certain computer games, acquired at home, carried cultural capital into the school setting. And, while some girls received praise from parents for technical competency, they

strategically used technical practices sparingly at school to “win social popularity as well as the grudging respect of their peers for their technical skill” (2001, p. 36). Rather than documenting a stable set of meanings and practices “within” contexts, this research traces a complex, dynamically shifting articulation of technoliteracy practices, social spaces, and identity.

Moreover, these practices are coproduced with specific discourses or representations of space (Lefebvre, 1991; Soja, 1989) concerning ICT in state policy, school policy, and the media. Research on technology and literacy must follow not only local practices, but the ways in which these practices are mediated by discourses about the Internet, literacy, and the life trajectories of youth. For example, Valentine et al. (2002) analyze how three case study schools constructed different discourses concerning technology, including “ICT for all” (including the wider community), “ICT as a life skill,” and “ICT in terms of academic achievement” (p. 312). These discourses helped to structure different types of access and surveillance of ICT practices in and out of school. Holloway and Valentine (2001) document how discourses of the “child in danger” and “the dangerous child” (Oswell, 1998) are appropriated (and sometimes resisted) by parents and schools in efforts to regulate Internet content. Relations to these discourses suggest how identities of “the child” and “the adolescent” are produced in relationship to computers and other nonhuman actors.

From remediation to semiotic self-fashioning

The relationship between computers and reading has been a research focus in the United States since the early 1970s, a research agenda that heavily emphasized remediation in its early years. The late 1980s and early 1990s were marked by a shift in research to broader considerations of the changing meanings of literacy with new technologies (Knobel, Stone, & Warschauer, 2002). To offer a more recent glimpse of a historical trajectory of research on online literacies, I turn to the *Handbook of Literacy and Technology* (Reinking et al., 1998). While the handbook was published in 1998, it is composed of papers that were originally drafted for a conference on technology and literacy held in Atlanta in October of 1996. I would like to use this restricted space to make a few observations about the handbook as a historical document, likely drafted in late 1995 and

1996, or just several years after then-Vice President Gore began to imagine and routinely invoke the “Information Superhighway” in his speeches (Wiggins, 2000).

A broad review suggests that much of the research agenda charted in the handbook remains important for ongoing research, including changing perspectives of literacy development, societal implications of reading and writing online, equity issues, processes of learning with new technologies, and understanding specific forms of literacy on the Web. However, other current trends in online literacy research depart, in degree or in kind, from the direction it charts. First, the handbook is shaped around the changing notion of text and its transformation in a post-typographic world. Even while the definition of literacy is being challenged, these challenges are typically framed in a language of transforming print texts, reading, and writing (notable exceptions include chapters by Jay Bolter and Jay Lemke). Second, while important ecological models of technology studies are discussed in two chapters (one by Bertram Bruce and Maureen Hogan and another by Jay Lemke), nearly all of the research represented in the handbook is concerned with issues of teaching and learning in school settings. Key issues include the design of new technologies for learning literacy, the development of technology-related pedagogies, and problems encountered in changing educational practices. The presence of the Internet in the lives of youth outside of school is all but absent in the book, with the exception of Tierney and Damarin’s extended illustration of the relations between boogie boarding, Internet communication, and other media. A third observation is that discussions of the relationships of online literacy to identity construction are not a focus of the book (however, identity issues are considered in chapters by Myers, Hammett, and McKillop; Lemke; and Tierney and Damarin).

I note these trends in current inquiry not as a critique of the handbook, but as a reflection of current shifts in the study of online literacies. These trends and others begin to suggest how new expectations are emerging concerning what research on media and online literacies might ultimately accomplish. What agenda lies beyond a deeper understanding of the (digital) text, the classroom, and pedagogy? A partial response involves a shift in focus from a fixation upon technological tools toward mapping the ecosocial systems (Lemke, 1998) through which new identities are being performed and produced. Online and media literacy studies do not have a corner on the market for the analysis of literacies as practices of the self (Holland, Lachicotte

Jr., Skinner, & Cain, 1998) within sociocultural-material networks. Yet such research does offer a unique set of opportunities to significantly advance our theories of the relations—which have always existed in some configuration or another—between semiotic production and consumption, human networks, and material-ideological tools.

Can methodology get an mlife?

Situated accounts of literacy practices have made a durable impression on how we perceive literacy; the spatial imagination of current literacy work has been powerfully shaped, for example, by Shirley Brice Heath's (1983) place constructions of Roadville and Trackton. Literacy researchers' ways with words and interpretive lenses have been formed by long-standing ethnographic traditions of relatively bounded places, including texts, literacy events, classrooms, schools, and communities. In researching online literacies, how do we move from "roots to routes," as the formulation goes, to how we trace and map the texts and contexts articulated in a moment of space-time of literacy practice?

How do we reimagine and study the event, the text, the classroom, the school and community as a nexus—a "field of relations" (Olwig & Hastrup, 1997)—rather than as a container? In what situations, and for what social purposes, are offline and online lives held apart? When are they merged? If the Internet itself is not a single thing, but a heterogeneous assemblage of practices, texts, and cultures, then how are online territories performed through semiotic practices (Dodge & Kitchin, 2001)? Further, what form does ethnography take when it is no longer necessarily about physically displacing oneself, but about experiential displacement, a process of following connections (Hine, 2000; Miller & Slater, 2000)? Moreover, (how) are we currently constrained by assumptions about "individual" research careers and projects, when, as Jay Lemke (2000, revoicing Hillary Clinton) claimed, it "takes a village" to study a (metamediased, connected) village?

Obviously, the methodological issues of researching online literacies are legion. For the development of online ethnography, these issues include researcher and participant identities, ethics, the nature of participant observation online, credibility, researcher knowledge and immersion in online culture, privacy, and many others. While a rapidly developing set of materials is emerging for such study in the social sciences in general (Jones, 1999; Lindlof &

Shatzer, 1998; Mann & Stewart, 2000), there is a vast amount of work to be done to appropriate and develop emerging methodologies for researching the online literacies of youth.

A second theoretical and methodological issue involves how to transform cultural historical activity theory (CHAT) for research in online contexts. I focus upon CHAT because this broad theoretical tradition has been widely appropriated and developed in literacy studies since the pioneering work of Scribner and Cole (1981). In many ways, the analysis of mediation, material technologies, language, culture, and the relations between individual and systemic change make CHAT appear ideal for researching online literacies. Also powerful in this work is the way in which Vygotsky's more simple formulation of mediated activity has been modeled as the complex activity system (Engeström, 1993). At the same time, activity systems are most often identified as locally situated groups organized in relations of copresence or within relatively clear boundaries shaped by negotiated objects: doctors and patients consulting in offices; children playing games in after-school clubs; scientists using diagrams in laboratories; athletes developing pole vaulting practices. Since its inception, CHAT has been primarily concerned with the analysis of human activities, "concretely present in space and time" (Engeström, 1999, p. 28). How are such formulations of learning and activity helpful for interpreting the actions of a young person involved in multiple IM sessions while simultaneously working on a homework assignment that involves Web searching and watching television? Should such a situation be considered a deviation from the norm? If individuals learn, or are transformed, in relation to activity systems, then how are activity systems laminated, folded, hybridized, or blurred (Alvarez & del Rio, 1999; Engeström, Engeström, & Vähäaho, 1999; Holland et al., 1998)?

Drawing on practice theory, a close cousin of sociocultural work, some research has begun to frame online activity in relation to communities of practice. However, in online contexts, it is often not at all clear what the boundaries of a given community are. Additionally, the sense of being engaged in legitimate peripheral participation online is less apparent than it may be, for instance, in the case of apprenticing in a Vai tailor shop, becoming a Yucatec midwife (Lave & Wenger, 1991), or learning in an insurance claims office (Wenger, 1998). While CHAT has informed theories of human-computer interaction (Nardi, 1996), an important methodological and theoretical problem for the study of online literacies involves reinterpreting CHAT theory

through a cultural and historical lens. That is, the explanatory power of CHAT is predicated on it being continually developed in relation to particular, historically developing forms of activity. If the theory itself is saturated with the activity of craft apprenticeship, laboratory experiments in the Soviet Union of the 1930s, or paperwork in modern offices, then it will be limited in delivering rich interpretive frames for interpreting online and offline lives and learning. On the other hand, if this theoretical tradition is broadened and transformed in use, then it could ultimately be a powerful and flexible means for understanding how new literacies are learned and culture is being transformed.

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Pedagogy, connectivity, multimodality, and interdisciplinarity

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Introduction

The histories of communications technologies have more similarities to the histories of millennial religion and cargo cults than might be immediately apparent. From the emergence of alphabetic writing as a portable, durable, and replicable means for the preservation of knowledge, to the development of typography and mass literacy, and to the early and mid-20th century emergence of cinema, radio, and television, shifts in dominant modes of information at once tend to generate moral, intellectual, and institutional panic and critique, as well as powerful

evangelical discourses about their capacity to revolutionise thinking, everyday life, and, of course, the practices of education. At the same time, dominant educational institutions—from Socratic dialogical circles, to medieval monasteries and universities, to the industrial-era school—do not have outstanding track records engaging with new communications technologies. This is in part because curriculum and teaching tend to be defined in terms of mastery of and engagement with dominant modes of information, whether of spoken language and gesture, inscription and print, or visual image. Simply, the domination of pedagogy by mode of information may prove harder to displace than any particular political or sociocultural ideology.

Many teachers and parents are concerned about children's engagements with contemporary media culture—whether the Internet, online or

console gaming, or television—and the practices of commodity consumption that tie popular and media culture together (cf. Luke, 1999; Sefton-Green, 1998). Such concerns and anxieties over children's alleged loss of innocence and their vulnerability to media and market seductions render the new technologies easy targets as they readily become objects of generational and political responses to the discourses and practices of new capitalism—its affiliated lifestyles, identities, and attitudes—that they have come to represent. In public debate they become, all too easily, substitutes and signifiers for large-scale social, economic, and cultural change and accompanying complexity and uncertainty. Yet the complex blends of “new” and “old” media are central to the experience of the everyday cultures of childhood and adolescence and are fundamental to the formation of young people's cultural identities. These media(ted) texts constitute children's first curriculum, often their initial entries into texts and textuality, and provide them with a common stock of cultural stories about social relations, power, gender and ethnic identities, and the worlds beyond immediate neighborhoods and communities.

In the midst of all this, educators have tried to come to terms with the contradictions between industrial-model schooling based on static print/book culture and competitive individualism and the collaborative learning possibilities and deterritorialized meaning making and knowledge configurations enabled by new technologies. Digital technologies have remediated traditional text genres and forms and have generated new modes of textual practice and immediacy (cf. Bolter & Grusin, 2000) such as e-mail and chat, online shopping, searches or e-ticketing, virtual reality, webcams, and so forth. These modes compress and reorganize spatial and temporal relationships both at the macrotransnational level and in more confined and delimited spaces for intersubjectivity such as the school and classroom. When learning is no longer geographically tied to a desk, the school library, the book, or the teacher who demands “all eyes up front,” then old-style transmission and surveillance pedagogy becomes less stable and less defensible but complementary to the out-of-school pedagogies and practices in households, communities, and workplaces.

One response is the transformation of singular print-based literacy into hyphenated, plural, or multiple literacies that acknowledge the diversity of information sources and media that people access, negotiate, and redeploy in everyday contexts. *Literacy* and *technology*, as Reinking, McKenna, Labbo, and Kieffer (1998) observed, are no longer mutually ex-

clusive but have merged in a combined vocabulary evident in most current educational debates and policy discourses. How literacy practices are being mediated by microcomputers, by connectivity, the Internet, and an expanding educational software industry and how instructional practices, learning, reading, and writing are being transformed have been of growing and serious concern to many educational researchers and teachers (cf. Alvermann, 2002; Durrant & Beavis, 2001; Hawisher & Seife, 2000; Snyder, 2002).

Pedagogy

Partially influenced by constructivist theories of learning and pedagogy (Bruner, 1990; Vygotsky, 1978) and poststructuralist theories of discourse construction, critical educational theorists have been arguing for the need to reconceptualize traditional concepts of literacy and teaching and learning relations in light of technologically mediated access to and relations with knowledge (Abbott, 2001; Reinking et al., 1998; Snyder, 2002; Watts Pailliotet & Mosenthal, 2000). A social constructivist view of knowledge and learning implies that learning occurs in situated sociocultural contexts and that knowledge is apprehended and appropriated in and through social interaction, dialogue, negotiation, and contestation. In the contemporary blend of “old” and “new” information environments, people draw on diverse sources of information, means of communication, and (virtual) community engagements, which suggests that learning and information exchange and production occur in socially interactive communities of learners. Multimodal readings and experiences of the world begin in infancy and constitute the social practices in everyday life. In fact, the classroom is one of the few places where formal taxonomic categories (e.g., the curriculum) and the official partitioning of time and space (e.g., the timetable) often are used to discourage children from blending, mixing, and matching knowledge drawn from diverse textual sources and communications media.

In turn, collaborative and constructivist theories of pedagogy and learning have dovetailed with emerging interest in problem-based learning (Savin-Baden, 2000) seen as more responsive to the diverse experiences and background knowledge of students and able to provide “richer” and more “authentic” situated learning experiences that demand interdisciplinary thinking and learning. Together, collaborative, constructivist, and problem-based learning are a

powerful conceptual antidote to pedagogy as transmission and knowledge as parcelled facts and objects, accessed monologically through designated official media. One of the potential effects of the constructivist turn has been the reconceptualization of knowledge acquisition and production as process, as design, as contextual, as situational, and, ultimately, as contestable, deconstructable, and criticizable. This locates knowledge and learning, rather than technology, at the centre of pedagogy. Computers and connectivity are but one resource among a platform of knowledge and communication sources that support, rather than drive, a critical, learner-centered constructivist pedagogy, and teachers remain an indispensable component in this mix.

The challenge of documenting and interpreting such changes has pushed conventional research methodologies. Research (e.g., Bonk & King, 1998b) into classroom applications of constructivist pedagogies and the use of collaborative electronic tools (e.g., groupware, e-mail, video conferencing) suggests that traditional qualitative methodologies such as interviews, observation, video, or journals must be combined with electronic transcript analysis. Observational data can map teacher instructional tactics (e.g., scaffolding, coaching) and student interactions in real-time face-to-face contexts, whether conceptualised as construction zones, contexts of situation, or so forth. Electronic transcript analysis of communication threads can identify patterns of metacognitive self-reflection, peer support, collaboration and discussion, learning pathways, and meaning negotiation. However, such research needs to move beyond mere categorization or enumerations of levels and types of student and teacher interactions and participation and also track the social dynamics, the social practices of literacy. Such research might include critical, discourse analytic, and ethnographic analyses of intersubjective, group, gender, and power relations; identity politics and the textual-semiotic construction of self and others; interlanguage, discourse, and register shift and language change; and the bodily and gestural practices generated by and through engagement with the new technologies.

Mindful of the risks and promises of information and communication technologies (ICTs) (Burbules & Callister, 2000), we need to investigate whether equity promises are being realized in the alleged hierarchy-free zones of online communication. Are these spaces more inclusive, and do all students, regardless of cultural or linguistic differences, gender, habitus, or ability, have an equal voice in light of claims that the online visibility of many bodily

markers of difference that *do* make a difference in face-to-face encounters virtually disappear in the bodyless domains of cyberspace (Jordan, 1999)? Because ICTs and global connectivity have transformed many aspects of public and private life, cultures, societies, and politics, we also ought to look at students' and teachers' knowledge base about the political economy of globalization; of ICTS; and of transnational financescapes, ideoscapes, infoscapes, and mediascapes (Appadurai, 1990). These are important lessons for students. A critical ICT literacy goes beyond skills training, effective use of electronic collaborative tools, and collaborative project- and problem-based learning. It includes a metaknowledge, a critical and self-reflective analysis of the sociocultural and political contexts of ICTs at global and local levels. We might ask the following: To what extent are teacher preparation programs providing more than mere operational skills training and incorporating a critical analytic perspective on these larger sociocultural and political issues, on changing educational epistemologies and practices, globalization, and the network society (Castells, 1996), or on the global digital divide? Are the perspectives, insights, and research we cite here being returned to future and practicing teachers and, in turn, to students?

Connectivity, multimodality, interdisciplinarity

As more texts become available in digital form, users access information in different ways that have potentially profound ramifications for reading and writing. It is worth recalling that the earliest reading research undertaken in Germany in the mid and late 19th century was an attempt to study the psychological effects of different patterns of manuscript layout and typeface (Huey, 1908). Although the fundamental principles of reading and writing have not changed, the process has shifted from the serial cognitive processing of linear print text to parallel processing of multimodal text-image information sources. Longhand pencil-and-paper writing is being replaced by keyboarding and, increasingly, iconic writing (button clicks). Text and meaning are no longer embedded exclusively in a linear sequence of alphabetic characters combined in a logical sequence of phrase, sentence, paragraph, and narrative units dictated by author intent or formatting demands of a page or book. In addition to potential alteration of the cognitive and psycholinguistic processes of read-

ing, requisite sociolinguistic competences have increased with an expanding “grammar” of semiotic imagery and codes. Finally, the behavioural, bodily, and gestural practices of responding to and constructing text are in transition.

Hypertext embeds text-image and (potential) meaning in a web-like pattern of links that readers can pursue or ignore. The hypertext author designs an editorial structure of potential meanings through links, but readers too structure their own transitions from one part of the text to another, moving from one set of emerging meanings to another (cf. Kaplan, 2000). The process of the link pathways chosen and those passed by demands a particular kind of reading, a cognitive mapping and pathway navigation that is quite different from the relatively choiceless linearity of book-based print. We need to develop a conceptual template with which to analyse the link cartography of webpage design that captures the semiotic construction of self-embedded and expressed (through link design and patterns) in the cartography or “liquid architecture” of the borderless open (hyper)text (cf. Burbules, 2001). In such a context the question is not whether but rather how, and in which directions, we should begin to alter the longstanding disciplinary training systems for teaching literacy. Taking this one step further, the very term and underlying assumptions of *literacy* probably warrant considered attention because so much of the social and institutionalised “schooled” practice of reading and writing is already so utterly transformed into much more *iconographic communications* practices.

Computer-mediated and online reading and writing are creative design practices of crafting and manipulating dynamic representational resources (Kress & van Leeuwen, 1996). These practices are increasingly less exclusively related to lexicosyntactic text and more to a foreground of complex iconography of pictures, symbols, moving images, and sound embedded in a background environment (and complex cultural and political economy) of global connectivity. Transcript analysis of electronic collaborative dialogue of the type described by Bonk and King (1998a) and emergent modes of semiotic and discourse analysis of student-designed webpages or games can begin to track the hybrid or “new” literacies that are emerging as students “discover” and “construct” knowledge (on project webpages or in collaborative e-dialogues) in the context of connectivity and mobility and a complex semiotic of alpha print, images, acronyms, symbols, and icons to shape and express their learning. Emergent literacy practices, new vocabularies and meaning systems, and

rapid lexical and semantic change are evident in the grammar of emoticons, the mutation of nouns to verbs (*to e-mail, to ftp, to cache in*), changes of acronyms to nouns (*url, faq, html*), the creation of new words (*emoticons, hyperlink, autobot, cybercash*), and investment of old words with new meanings (*browse, boot, bullet, button, flame*). The rapidity of linguistic change as a consequence of computer-mediated communication and connectivity (Shortis, 2000) is probably most evident in the communicative “shape-shifting” among young people. At the same time, it marks out a powerful mode of intercultural communication whereby youth and adults alike communicate across geographic, cultural borders using new invented and creolised lexical items, semantic and discourse structures, and images and metaphors. This raises the issue of generational divide: whether “our” generation’s largely print-based theories and 20th-century social science training, assumptions, and analytic lenses are sufficiently flexible and innovative to enable us to “read” and “see” beyond the conceptual horizons of normative models of text, language change, identity, learning, and so forth.

Industrial-era collection code curriculum delivered through traditionally framed pedagogy measured academic outcomes and success on the accumulation and reproduction of isolated facts in discrete subject domains and on the acquisition of generic behaviours, intellectual and cognitive processes, and so forth. Akin to Freire’s (1972) banking concept of education, collection code curriculum implies that teachers deposit knowledge “bits” in students who, in turn, accumulate, indeed collect, largely disconnected discipline-based facts and figures through skill-and-drill pedagogy. By contrast, in digitalized knowledge and networked environments, critical understandings of the *relations* among ideas, their sources and histories, intertextual referents and consequences, are as important if not more so than mastery, reproduction, and recombination of discrete facts or units of information. The conceptual shift here is one from collection to connection, or what Bernstein (1996) might have termed curricular *collection codes* to what we could term *connection codes*. Thinking laterally across associations, developing a meta-awareness of the links or paths taken and those passed over, backtracking along paths, reading and viewing hybridised old and new media genres and forms, and using a comprehensible meta-language to describe and discuss such practical reasoning with others—these are the very rhizomatic conceptual and cognitive maps required to read through and think through localized branchings of larger global knowl-

edge units (disciplinary or otherwise). Thinking across associations, accessing and integrating knowledge laterally, are the very cognitive, socially situated repertoires we use to negotiate everyday life and are core requirements for hypertext navigation.

In that regard, hypertext's multimedia and multimodal interface and gateways to laterally connected and further embedded information sources or knowledge domains come closer to an authentic representation of the interdisciplinary, multimodal, and multimedia connectedness of knowledge as we experience and enact it in the contexts of everyday life. Furthermore, as is the case in negotiating multiple information and sensory data in the course of everyday life, we need to acknowledge the fluidity and plurality of young people's engagements with new media and the simultaneous, often overlapping, decoding, production, and interactional contexts in which they routinely engage. There's nothing unusual about kids console gaming, text messaging on the cell phone and online at the desktop, and keeping one eye on this week's favorite television program—all the while claiming to be doing homework.

Making meaning from the multiple linguistic, audio, and symbolic visual graphics of hypertext means that the navigator must draw on a meta-knowledge of traditional and newly blended genres or representational conventions, cultural and symbolic codes, and linguistically coded and software-driven meanings. The dynamics of lateral and cross-linked information of hypertext requires and generates a cognitive orientation akin to what is often termed *lateral thinking*—the very creative, critical, and aesthetic practices many educators are actually “inventing” in classrooms and curriculum. That is to say, instead of learning and thinking “vertically”—deductively or inductively—within the root structures of disciplinary boxes, connectivity and hypertext environments demand horizontal or lateral cognitive mobility across disciplines, genres, modalities and, indeed, cultural zones. The global cross-cultural information flow on the Internet and the global composition of many virtual communities (whether chat, gaming, special interest, or classroom communities) require new ways of thinking about transcultural communication in our “readings” of and interaction with others from culturally diverse backgrounds. Intertextuality, transcultural communication, multimedia, or intermediality (Semali, 1999); metamedia (Lemke, 1998); and multimodal multiliteracy (Luke, 2000) are features of the new communicative order (Kress & van Leeuwen, 1996; Snyder, 2001) in which young people's orientation

to online information, knowledge, learning, and communication is shaped.

New media: New research questions, new analytic tools

The last great breakthrough in the social sciences to have a direct impact on literacy (then reading) research, was the heralded linguistic turn of the 1960s and 1970s. The resultant shift was from psychological models of literacy to a fuller engagement not only with the linguistic features of literacy but also with theorisation of the constitutive force of text and discourse in the construction of knowledge and power, identities, and institutions. But, as is the case with classical paradigm shifts, the host of insights may also set new limitations in our epistemological definitions and research methodologies. One consequence of the 1970s linguistic turn was a theoretical logocentrism, which implied that the categories and terms of linguistic analysis could be generalised across and through new modes of expression, aesthetic design, and discourse.

We may need something more. The texts of the new technologies have mutated into complex, hybrid semiotic systems that have made new demands on reading and writing, viewing, social exchange, and communication. These, in turn, require multimethodological and interdisciplinary analyses of the social and cultural, and the semiotic and linguistic. New media and complex connectivity generate new research questions that require new analytic tools as well as innovative combinations of the old with the new. Ethnographic case study research remains indispensable in classroom research of teacher practice, student semiotic and verbal interactions around the screen, online teaching (Cunningham & Rivett, 1999), curriculum integration of ICTs, and learning outcomes of electronic collaborative project- and problem-based pedagogy (Bonk & King, 1998a; Loveless, 1999). But traditional observational (or video) and interview-based research ought also to look beyond the classroom at other literacy events, practices, and sites such as private e-education providers (e.g., Futurekids) where “smart parents” send their “smart kids” to top up and extend their digiskills (Nixon, 1998). Out of the classroom, how are the school library and its librarians' functions and teacher and student use changing as a consequence of the shift from library to cybrary (Kapitzke, 2001, in press)? How are banks of touch-screen computers changing students' research practices or the librarian's

story hour? When all library resources are transposed to the screen from (often dog-eared and dated) books on shelves in rows, how does the social and spatial organization of “library period” change? We might recall that for many generations the library provided aisles of refuge from the teacher’s eye and deskbound protocols; it was a place for lounging on the floor, passing secret notes through the stacks, or maybe a romantic interlude. We also ought to continue to look at household access to and practices with ICTs because family resources, dispositions, attitudes, and values in relation to literacy and, not least, technology remain profound influences on young people’s out-of-school ICT proficiency, literacy development, and attitudes toward learning and new media.

Although hypertext and the Internet are placeless and immaterial in a literal sense, the user-reader-viewer interacts with the interface to the virtual from an embodied space, a material place (home, school, office), reads and writes in real time. The materiality of interaction among teachers and students at and through the screen requires a new way of looking at the temporal and spatial presence in the disembodied and immaterial spaces of flows. So, on one hand the importance of old-style ethnographic studies of real bodies in real time connected to new forms of immaterial but nonetheless real spatialities located *within institutionalised educational contexts* remains crucial. On the other hand, the bigger challenge is to devise flexible and innovative analytic tools with which to track the fluidity and mobility of “travel” across the semioscape of links, knowledge fields, webpages, chat rooms, e-mail routes, intersubjective and intercultural relationships, and so on. Capturing the idea and practices of mobility and flows—of the subject’s circuits and trajectories, semantic-semiotic production and consumption—across the Internet’s global terrain of signification, which operates in real time but nearly instantaneously and yet never stops (Jordan, 1999), is probably at present beyond what electronic transcript analysis, interview, observational or survey data, electronic site logging, or even critical discourse analysis can reveal. As Burbules (2001) argued, learning with and on the Web is not just about information access, retrieval, or even critical hyperreading. Rather, we should conceptualise “learning in the context of the Web as the achievement of a certain kind of *mobility*...to move within...across and...against the pathways that seem to determine users’ options for navigation and for meaning-making” (p. 83). The challenge for educational theorizing and research, then, is to devise a flexible conceptual and methodological mix based on an

equally flexible—indeed provisional and transformational—epistemology with which to capture the dynamics of mobility and travel across media, modalities, information nodes, communities, link pathways, and networks that demand and generate new kinds of learning, (meta)cognitive routing, multisemiotic literacy, identity construction and performance, community ethics, and sociality.

This will require something more than an uncritical application of traditional methodologies often dictated by research funding criteria. We need to move beyond the quantitative/qualitative divide and craft new hybrid methodologies and theories that, in effect, must play catch-up with the unprecedented textual and social practices that students are already engaging with, often on the sly. In one sense, students and teachers are the ones who are already experimenting with new technologies and already pushing the boundaries of research, however intuitively and randomly.

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Researching new forms of literacy

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Introduction: Mutating literacies

The job of young people is to make sense of the world as they find it. They do not necessarily perceive print as the primary source of cultural meaning, whatever the adults in their lives believe. Gitlin (2001) offered a snapshot of the reality of contemporary young Americans: “The average American child lives in a household with 2.9 televisions, 1.8 VCRs, 3.1 radios, 2.6 tape players, 2.1 CD players, 1.4 video game players, and 1 computer... A great deal about the lives of children depends on their race, sex, and social class, but access to major media does not” (p. 17). Children have considerable private control of their access to media; among children aged 8 to 18, 65% have a television in their bedrooms, 86% a radio, 81% a tape player, and 75% a CD player (p. 18). Livingstone and Bovill (2001) confirm that the northern European scene is largely similar.

Kinder (1999) supplied one radical interpretation of how children move through the multimedia symbol bath in which they find themselves: “I will argue that what children are learning is how television mediates the understanding of all other forms of cultural production and introduces the basic cognitive categories for organizing perceptions of the world” (p. 184). Zingrone (2001) provided an equally strong statement of contemporary reality: “A one-medium user is the new illiterate” (p. 237).

As they come to terms with the media present in their lives, Western children also embark on the interpretive challenge of brand recognition (and branding includes literary products as well as fast food). The market presence of texts is an important component of developing literacy. For example, *Sesame Street* is an internationally known educational television program, produced by the Children’s

Television Workshop for the American Public Broadcasting System and rebroadcast in adapted forms around the world. The most cursory overview of its associated products shows a more complex picture. In September 2002, amazon.com offered the following *Sesame Street* titles: 17 DVDs, 52 toys and games, 55 popular music texts, 87 videos, 648 books, and 11 software packages. More than 300,000 websites associated with the title are listed on google.com. Children's daily lives are often targeted very intimately, with *Sesame Street* images emblazoned on their most domestic accoutrements: flushable moist wipes, bandages, and a (now discontinued) *Sesame Street* Learning Potty. If television helps to establish essential categories in children's early understanding, then aspects of marketing and brand recognition gain early priority. How this kind of background understanding is implicated in children's developing control of print literacy is a major question to which the answers are presently far from clear. Young children reading any of the 648 *Sesame Street* books inform their understanding of how these particular words and images work by combining their interpretation of the information on the page with perceptions gained from television and other media. As Hartman (2002) put it, "The spoken or written word does not lose its central place in communication yet its *reception* is increasingly dependent on other media" (p. 13, italics added).

At the same time, the printed word itself is undergoing various mutations. Simple decoding of letters has never been the whole story of reading print. Page design and the informational technology of the book itself have always mattered to new readers, as to their experienced counterparts. Meek's (1988) respectful observations of young readers provided a classic account of some learning challenges involved in mastering the apparatus of the book and still offer a dynamic model for research into readers' actual behaviors.

Children are especially polysemic users of books. From the early days of print, children's texts have been distinctive, regularly providing plural channels of expression. As early as 1658, the first children's information book, *Orbis Sensualium Pictus*, included pictures as well as words. As is still true today, the pictures inflect the meanings of the words, and the words direct particular attention to aspects of the pictures. Meaning arrives through both channels, and young interpreters learn that polysemic understanding is richer as a consequence. To this day, picture books and other forms that merge print and graphics can tell complex and even contradictory stories, but a little assistance makes them accessible

to very young children. Before we turn to any media or online texts, therefore, we have ample evidence that young children can be capable polysemic interpreters.

Words may shift their connotations when associated with one picture or another, an old and familiar phenomenon. What now is newer and may seem more threatening is the many other ways words can only be read mutably, in context. A phrase may appear in many guises, such as the following:

- set off from the rest of the page inside a shaded box;
- highlighted and read aloud to the accompaniment of music, on a CD-ROM;
- underlined and differently colored from the remaining words on a computer screen and thus marked as a hyperlink that will evaporate into new words when we click the mouse;
- inside the drawing of a book on a movie screen, fading into the alternative storytelling channels of sound and moving images;
- moving into existence letter by letter and deletion by deletion in an Instant Messaging conversation;
- in attention-grabbing bold letters as part of a sales pitch;
- soberly cast into a column of print on a page that purports to give us straight information;
- or
- extended or contradicted by an associated picture.

When we have learned to decode the letters of this phrase into an intelligible set of words, we must still learn to manage our interpretations of the remaining information that the *presentation* of this phrase offers to readers. An understanding of reading that could be satisfied simply by the successful pronunciation of the words of this phrase (necessary and important though that decoding process will always be) would be restrictive and counterproductive. New forms of media presentation highlight the importance of an old necessity.

Reading researchers and all adults working with children must take account of this broad and changing context and acknowledge that contemporary new readers have *no other way* of learning about reading except within the context of a background of vast textual experience across many media and through multiple forms of address.

Developing new research tools

Now more than ever we need thick description of interpretive acts, thick analysis, and thick theorizing. A thick description of reading attends to the contributing roles of reader, text, and context. A reader is not a neutral decoder; a text (in real life, at any rate) is not a laboratory specimen; and a context includes not just the immediate interpretive situation but also broader social, cultural, commercial, and technological considerations. To take a single, relatively simple example, today's readers need far more extensive capacities for selection than readers of 150 years ago, who were more likely to be starved for new books than glutted for choice in a variety of competing media. Gitlin (2001) went further and said we must learn "not only principles of selection but stratagems of inattention" (p. 118) in the face of constant competing signals aiming for our attention. "But tactics of inattention are hardly enough. We need navigational strategies as well" (Gitlin, p. 119). Laboratory research alone will not uncover the cognitive and affective strategies needed to cope in this multitextual universe.

Tyner (1998) has challenged the idea that media exposure (particularly television) must always be regarded as detrimental to the development of print literacy. She spoke instead of an asset model, a useful concept for focusing new research. "An asset model for media teaching assumes that mass media and popular culture content can work as a benefit to literacy instead of as a social deficit" (p. 7). We need research that explores how developing readers transfer interpretive capacities across media.

In a time of rapid communication transition, it is more important than ever to pay attention to the full context of contemporary literacy. Scholars of children's literature must also read the business news. The commercial framing of all texts has shifted radically over the past 25 years, and the impact of decisions in the worlds of publishing and communications technology on how children learn about reading is crucial and must not be taken for granted. Books used to be perceived as outside the more rapacious commercial framework of other media where advertising is rampant. Many indicators remind us that this perception is not true any more, if it ever was. Two telling examples from September 2002 follow: (a) An advertisement in the online newsletter of *The Bookseller*, the British book trade journal, exhorted publishers to attend a branding exhibition by stating, "Looking to catch the hottest new properties, which could translate into big book sales or to see whether your book characters have licensing po-

tential? Then check out Brand Licensing London...it is the publishing trade's must-attend event" (Brand Licensing London, September 13, 2002); (b) on another, troubling, front, in *The Washington Post*, Strauss (2002) highlighted a controversy about whether or not the Bush administration is promoting particular commercial reading schemes. If true, these charges undermine the noncommercial and disinterested framework of schooled literacy that we have long taken for granted.

Just as we need to take a broad view of the complex context in which texts are supplied to their users, similarly, it is essential to take account of changing practices among these users of texts. For example, many people's viewing behaviors (going to a movie, switching on the television) are now hugely enlarged to include an enormous amount of reading and writing (checking out Internet sites, signing onto a chat room), all directly related to the viewed text. Meek's (1988) insight that texts teach what readers learn remains true, but researchers also need to note that readers—perhaps especially young readers—can show us what forms of attention texts are now teaching.

Researchers must also find ways to accommodate interpretive phenomena such as the unique text (e.g., a singular reading of a hypertext, an individual instantiation of a computer game) and the collective text (e.g., a chat-room discussion of the details of a movie or television program). Such examples offer challenges concerning both how to record and how to assess interpreters' experiences of text in such situations.

Research into polysemic interpretation

So many strands of research converge in the field of literacy studies that it is difficult to make a brief survey of the history of that field. The concept of polysemic interpretation, making sense of texts with multiple channels of information, can perhaps serve as a guide, since it is media-neutral. One consistent source of analysis of how polysemic texts are delivered is the study of picture books and, more recently, graphic novels (e.g., Lewis, 2001; McCloud, 2000; Nodelman, 1988). Other research more explicitly addresses the broader contemporary scene of numerous and ever-expanding forms of polysemy (e.g., Alvermann, Hinchman, Moore, Phelps, & Waff, 1998; Cope & Kalantzis, 2000; Flood, Heath,

& Lapp, 1997; Mackey, 2002; Reinking, McKenna, Labbo, & Kieffer, 1998; Turkle, 1995).

Work with print readers has often featured a less polysemic, more narrow focus on aspects of print decoding, which has often yielded valuable insights but fails to take account of the cultural embedding of all literate experiences. Some cultural studies projects have taken account of young people's cross-media interpretive capacities; the work of Dyson (e.g., 1997, 1999) stands out for its combination of close-focus and wide-angle vision. Livingstone and Bovill's (1999, 2001) work in Britain and Europe is also useful, as are the projects more based in cultural studies and reported by Hilton (1996), Sefton-Green (1998), and Marsh and Millard (2000). Explicit work on how new texts can work is also helpful, and Murray (1997) remains a particularly useful source.

Understanding the "thinking we"

How do interpreters select their own priorities for understanding a text from the multiplicity of forums through which texts are conveyed in today's textual market? How do readers' own productive capacities (e.g., corresponding in a chat room, creating a website, writing fanfiction) influence their reception of a text? To what extent do new productive capacities create a new kind of response? Such questions are urgent.

Given the complex and interconnected textual environment in which all reading now occurs, as much research as possible should attend to issues of reader, text, and context. Research need not always include all three at once, or in identical proportions, but studies that focus on one element without even acknowledging the absence of the others are undermining their own utility. Detailed questions of eye movement, letter decoding, and so on are still important, but their limited and particular role in the development of adequate forms of literacy needs to be kept in mind. Literacy is one way of moving in the contemporary world, and no letter is ever decoded in a vacuum; even in a laboratory experiment, the removal of context is itself a context and one that may well interfere with a reader's normal strategizing approach.

An emphasis on context or on particulars of decoding also must not overwhelm the intensely private and interior meaning making that is at the heart of reading. When we engage with a verbal text, on page or screen, we think with somebody else's words. Poets and philosophers have spoken to the mystery of this intimacy. Dickey (1987) said that poetry is

"an awakening of the sensibilities of someone else, the stranger" (p. 105). Taylor (1991) said, "The very form of a work of art shows its character as addressed" (p. 35). From Lyotard's (1983/1988) idea of "The we composed at least of *I* who write and *you* who read" (p. 103), Derrida (2001) developed the idea of the "thinking we" (p. 241). The address to the stranger and the creation of the "thinking we" are profoundly significant elements of writing and reading, and concepts that must not be lost as research explores new forms of technology.

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New research literacies for contemporary research into literacy and new media?

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1. New topics for literacy research

The term *literacy* remains highly contested, and debates continue about how literacy might best be researched and to what ends. For some, literacy is simply a matter of acquiring the technical competence that enables people to read and write. Literacy research conducted from this point of view does not usually concern itself with the new media but rather focuses on how people learn to code and decode print text. For others, however, literacy is more complex and involves learning a repertoire of practices for communicating and getting things done in particular social and cultural contexts. Literacy research conducted from this sociocultural point of view accepts that the new media are central to the field because in everyday cultural practice people are using the new media to make meaning, to express themselves, and to communicate and work with others. Sociocultural approaches to literacy research have already provided rich material that has assisted educators to understand literacy practices in everyday use (e.g., Barton & Hamilton, 1998; Barton, Hamilton, & Ivanic, 2000) including children's appropriation of the media in school-based writing (Dyson, 1997). However, the changing semiotic and cultural prac-

tices associated with new media and online participation have less frequently been the object of study.

In places such as the United States, Australia, Canada, the United Kingdom, and Europe, statistical studies (e.g., Australian Bureau of Statistics, 2001; Center for Media Education, 2001) and ethnographic studies undertaken in sociology, geography, and cultural studies (e.g., Buckingham, 2000; Holloway & Valentine, 2000; Livingstone & Bovill, 2001; Sefton-Green, 1998; Skelton & Valentine, 1998; Valentine, Holloway, & Bingham, 2000) have shown that computers and the new media are increasingly central to the lives of today's children and youth. Young people, more than most age groups, are taking opportunities to videoconference and make telephone calls over the Web and to participate in text-based or graphics-based live chats with others across the globe. They are using the new media to participate in computer game culture; popular music culture; and forms of fan culture associated with sports, film, and television. Such research shows that global popular media culture, including online culture, has become integrally bound up with children's and teenagers' affiliations, identities, and pleasures. Their participation in global media culture shapes the way they communicate and the kinds of social

identities they take on. It informs how they present themselves to others and their understandings about the social groups and communities to which they might conceivably belong. This kind of social participation is integrally bound up with the ways in which symbolic meanings are made, negotiated, and contested and is therefore of central concern to literacy research.

However, literacy educators and researchers have, by and large, judged such research about participation in the new media and online cultures to be of little relevance. This is surprising on at least two counts. First, as Kevin Leander (earlier in this issue) points out, within the field there has been a good deal of attention paid to out-of-school literacies (see review in Hull & Schultz, 2001). Second, as people participate in the complex repertoire of evolving social practices associated with new media, they simultaneously engage with practices that are readily recognizable as literate practice and that have traditionally been the focus of literacy research. They read and produce text. They manipulate language and they communicate with others.

However, there may also be significant differences between print literacy and new media and online literacies. In today's changing landscape of communication, visual and verbal modes of communication are blurring, and meaning making is becoming increasingly multimodal (Kress, 1997, 2000b; Kress & van Leeuwen, 1996). Not only do users of new media manipulate language, they also make meaning from other semiotic modes such as image and music. Not only do they produce texts familiar from print literacy, they also produce professional quality video, music, and multimedia presentations that are unlike the texts with which most literacy educators and researchers have previously worked. Not only do young people use the new media to communicate in many ways, they also operate within the "communicational webs" of global media culture and digital technologies that are constituted by new media and new modes of communication (Kress, 2000a). Within these communicational webs, different media such as television, film, personal computer (PC), the mobile telephone, and personal digital assistant (PDA) are economically, semiotically, and functionally interconnected with different modes of communication such as writing, talk, and still and moving images. Moreover, many young people move rapidly and apparently seamlessly between multiple media and modes of communication as they participate in global media culture. This changing constellation of semiotic and spatial practices associated with new media and online

literacies constitutes a very different object of research than has traditionally been addressed by literacy researchers.

2. Establishing a robust research agenda

Literacy research undertaken from a sociocultural perspective has produced at least two models that in my view hold promise for productive future research into the changing and multiple literacies associated with new information and communication technologies (ICTs) and new media. The four resources model developed by Peter Freebody and Allan Luke (Freebody & Luke, 1990; Luke & Freebody, 1999) and the 3D model developed by Bill Green (Durrant & Green, 2000; Green, 1988; Lankshear, Snyder, & Green, 2000) both take into account the technicalities of learning how to encode and decode to make meaning as well as the more complex literate practices required to participate actively and successfully in diverse social and cultural contexts. Each model attends to the issues of reader, text, and context as discussed by Margaret Mackey (earlier in this issue) and provides a potential starting point for the development of a comprehensive literacy research agenda in relation to new media and online literacies. To date, these models have been applied mostly to school-based studies of literacy (e.g., Lankshear, et al., 2000).

Freebody and Luke (1990) argued that literacy is made up of four resources or families of practices that enable people to do the following: (a) break the code of texts, (b) participate in the meanings of text, (c) use texts functionally, and (d) critically analyze and transform texts. Effective literacy practice involves being able to draw from these resources to develop a complex repertoire of capabilities, which includes coding and decoding but also functional and critical competencies, and putting them to work where appropriate in specific situations.

Green's 3D model considers literacy to be an ensemble of social practices that involves three dimensions: operational, cultural, and critical, which overlap, intersect, and are interdependent. This model was influenced by Green's (1988) research into the relationships between literacy and subject or content area learning and was subsequently developed in response to the increasing "technologisation" of literacy (Bigum & Green, 1993). Green uses the shorthand device of emphasizing the IT in the word I(IT)eracy to symbolize the bringing together

theoretically of literacy and IT within his model. The *operational* dimension of l(IT)eracy learning includes how to make the computer work from the basics of turning on to searching databases or operating a CD-ROM. The *cultural* dimension includes understanding that we use texts and technologies in particular contexts to make meaning and to do things in the world. The *critical* dimension of l(IT)eracy learning includes being able to assess and critique software and other resources and to appropriate or redesign them for particular purposes. This model emphasises that literacy learning is done as people participate in the social and cultural practices of making meaning for real purposes, and that textual and communicative work is always done in actual communities and institutions and has real effects.

Although any one study might foreground one or more aspects of the model at any one time, the entire “repertoire of capabilities” discussed in the four resources model and all three dimensions of the 3D model would need to be systematically explored in literacy research designed to address the new media and online literacies. We need studies of the textual features and dynamics of the new media genres children and young people use, as well as studies of how and why they engage with, control, construct, and critique these new texts and genres in specific contexts. Taken together, the complexity of the contemporary symbol, media-saturated environment, and children’s simultaneous cognitive and affective engagements with online and offline worlds mean that we cannot afford to have a narrow literacy research agenda for the future.

Theoretical work based on studies of contemporary texts in the changing communicational landscape could provide working concepts for researching the *code-breaking* or *operational* resources that people bring to bear on the reading, understanding, and production of new kinds of multimodal and online texts. Potentially useful theoretical resources include theories of hypertext (Snyder, 1996) and Kress’s (1997, 2000b) conception of the six design elements of the meaning-making process: the audio, visual, linguistic, spatial and gestural elements, and the multimodal patterns of meaning that relate the first five modes of meaning to one another. However, such theoretical resources offer little assistance about how to systematically collect and analyze data about the way people create and negotiate multimodal textual forms in everyday situations.

Investigations of the *cultural* dimensions of meaning making associated with new media environments necessarily need to take place in a variety of contexts. We need ongoing analyses of “technotex-

tuality” (Collins, 1995) that investigate the cultural mediation of information about the new media and new literacies (Nixon, 1999). We also need studies of the new symbolic and knowledge economies being shaped by economic and cultural globalisation and studies of the differential effects of the new media on people in different nations, regions, and communities (Hawisher & Selfe, 2000). At the same time, we need studies of how people use the media for specific social purposes inside and outside schooling and in the intermediary spaces and places between them (Vered, 2001). This includes studies of situated everyday practice such as Smith’s (2002) exploration of the relationship between technology, play, and literacy in a very young child’s engagement with CD-ROM storybooks, Tobin’s (1998) exploration of a 15-year-old boy’s engagement with the Internet chat and Web authoring, and larger scale studies of computer use by children and families (e.g., Facer & Furlong, 2001; Facer, Furlong, & Sutherland, 2001). We also need longitudinal studies and rich school-based case studies that go beyond the snapshot approach reported by Lankshear (1997) and Lankshear et al. (2000). However, there remain significant cost barriers to this kind of research as well as considerable uncertainty about what constitutes appropriate and useful data and how it might best be collected and analyzed. This is due in no small part to the newness and constant change of ICTs as well as the relatively slow uptake of the new media within schooling other than in specialist areas such as computer-aided drawing and design. Although media education has a history of practical work, literacy education has been much slower to move from its focus on reading and writing to a focus on production and “making media” (Sefton-Green, 1995, p. 77) and has been reluctant even to accept the importance of drawing and hybrid verbal-visual semiotic practices for children beyond the early years of schooling (Millard & Marsh, 2001).

Literacy research that focuses on the *critical* dimension or transformative and redesign elements of new media and online literacies needs to be undertaken in a similarly diverse range of contexts. Outside schooling, this might include studies of how young people exercise agency in various forms of digital fandom and new media and Internet activism (Kenway & Bullen, 2001; Klein, 2000). As yet, there have been very few studies of critical and transformative new media literacy practices within school-based education. Exceptions include Alvermann, Moon, and Hagood (1999), who reported on critical media literacy practice in English language arts classrooms, and Hammett (2000) and Myers, Hammett, and

McKillop (2000), who explored students' use of digital production to produce multiple and alternative readings of canonical and popular literary texts. Beach and Myers (2001) also explored possibilities for students' use of new media "to critique ideas about lived, represented and virtual worlds through authoring the sequence and juxtaposition of images, text and audio" (p. 180). More theoretical and socially situated research is required to explore further the possibilities and limitations of agency in relation to new media and online literacies.

3. Old and new literacies

Conceptions of literacy, including what it means to be literate in relation to computers and new media, are socially constructed and subject to change (Goodson & Mangan, 1996). Although successive advances in material technologies extend the boundaries of what was previously possible in relation to representation, meaning making, and communication, some literacy practices from the past also remain in use and hybrid forms emerge (Bruce, 1997).

Research that explores the traditional cornerstones of literacy and language arts—reading, writing, listening, and speaking—is still relevant in the age of new media. However, the new modes of representation and communication made possible by the new media introduce new dynamics for readers and writers (Goodwyn, 2000), changing conceptions of text and textuality, and new emphases on oral language (Kress, 2000a), all of which pose challenges for researchers and educators alike.

4. Expanding our repertoire of research capabilities

As Margaret Mackey (earlier in this issue) argues, situated research in the new media and online literacies needs to include "thick description of interpretive acts, thick analysis, and thick theorizing" (p. 405). However, traditional methodologies and protocols for literacy research may not be adequate for the task. Leander (earlier in this issue) discusses the potential for literacy studies of theories of spatiality being explored within cultural geography. Theories of aesthetics and spectatorship developed within art theory and film study also suggest possibilities for studying the kinds of interactivity and pleasures associated with the new media genres of digital visual

culture that focus on surface play and spectacle (Darley, 2000). Nonetheless, the socially situated study of computer gaming and other online practices also poses significant practical challenges because participation is often conducted in domestic or dedicated spaces, in real time, and may leave few traces. Similarly, it raises complex ethical issues because such participation is often integrally bound up with presentations of self. Such research also poses challenges for literacy researchers because, even though participation in game play may reconfigure and extend literacy and communicative practices (Beavis, *in press*), it also appears to rely more on immediacy, immersion, and corporeal sensation than on interpretation and intellectual engagement (Darley, 2000).

Even in school-based literacy research we face significant methodological and practical challenges, and there has as yet been little published about research techniques that might assist us. We remain uncertain about how we can systematically observe the new practices associated with computer use. We are often unsure about what we are seeing and how we can best describe it or analyse it using our existing skills. How might we best collect quality audio and video data of situated computer use in noisy and dynamic classrooms? Would it be useful to develop read-aloud protocols that might assist us to understand children's navigational and meaning-making processes while they use the computer? How might we construct useful data sets based on textual traces and "drafts" of media production work when teachers, and often researchers, have limited operational knowledge of the technologies involved? What forms of analysis should be applied to multimodal texts produced by children and by commercial producers? Do these techniques hold for new textual forms such as computer games that, although multimodal, also manifest a poetics of surface play and sensation (Darley, 2000) with which we are largely unfamiliar? As literacy and English language arts researchers, we focus on signifying practice, which may be misplaced in relation to some popular contemporary genres and expressions of digital culture. Computer games and music videos, for example, may be more concerned with aesthetically formal play that involves repetition, recombination, juxtaposition, and display than with representation and meaning making (Darley, 2000). Even hypertext, encountered everywhere online, constructs scenarios of juxtaposition that require reading by association (Thurstun, 2000) and across and between surfaces and media rather than the processes of character identification, narrative engagement, and other forms of

signification familiar from most fictional and many expository print texts.

It seems clear that future research into new media and online literacies will need to be multifaceted and multidisciplinary in order to study the dynamism and fluidity of people's engagement with emerging new media forms, which in turn are less clearly demarcated and less materially bounded than in the world of print literacy. We need to find ways to expand the scope of our research beyond the words, symbols, technologies, and environments of the new media in order to explore how these things are "networked" and how they "dynamically interact" in everyday social practice (Gee, 2000, p. 184). Just as the sociocultural approach to literacy suggests that people need to develop a broad repertoire of capabilities appropriate to a range of contexts, so too do we as literacy researchers need to develop a more three-dimensional version of research literacy in order to expand our repertoire of capabilities in relation to the study of new media and online literacies. While it is not yet possible to specify exactly what such an expanded repertoire of capabilities might look like, Green's 3D model could provide a useful heuristic tool. The model suggests, for example, that we might need to work simultaneously on three dimensions of an expanded research literacy practice—the operational, cultural, and critical. In addition, like teachers and students, we might at the same time need to develop all three dimensions of our own l(IT)eracy learning. That is to say, literacy researchers might need to develop new repertoires of literacy practices on two fronts: (a) in relation to our *everyday use* of ICTs and new media and (b) in relation to how we *research* new media and online literacies.

While I would not wish to prioritise the operational dimensions of ICT and new media use, my own school-based research suggests that unless educators and literacy researchers have a reasonable degree of how-to knowledge within their repertoire of capabilities, any cultural and critical work they do in relation to l(IT)eracy is necessarily limited (Nixon, 1998, 2001; Nixon & Kerin, 2001). Hence we may need to keep abreast of how the new media actually work. In addition, an expanded operational dimension of *research* literacy might involve exploring how to use the new media for organizing research projects, generating and gathering data, and so on. In order to develop the *cultural* dimension of l(IT)eracy, we must also use the new media for meaningful social purposes. In order to expand the cultural dimension of our *research* literacy, this might mean finding ways to overcome potential barriers to

understanding between literacy researchers and research informants who work in different contexts and for whom research projects often have different purposes and meanings. For example, in research projects that newly attempt to bring together reading and writing with ICTs and new media, researchers and school-based educators may not always share the same beliefs or understandings. We may therefore need to find ways to bring together the different *cultural* dimensions of such research as it is lived by diverse participants. The goal would be to establish a common language and some shared understandings about new media and online literacies and how these might be researched. In the process, literacy researchers may need to assume new kinds of ethical responsibilities, forge new kinds of collaborations, and bring together hybrid combinations of disciplinary understandings to share with our collaborators.

In Green's 3D model, the *critical* dimension of l(IT)eracy learning includes being able to assess and critique software and other new media applications and resources and to appropriate or redesign them where appropriate. The emphasis in the critical dimension on transformation and redesigning highlights the importance of production or "making" for learning through, with, and about the new media and ICTs. In regard to *research* literacy this might mean finding ways to use the new media to represent and to problematise our research. The critical dimension of an expanded repertoire of research literacy practices would also include developing ways to foreground in the implementation and representation of our research the evolving ethical, cultural, environmental, and societal implications associated with ICT and new media use and to foster "a sense of stewardship and responsibility" (Faigley, 1999, p. 137) among research participants regarding their use. It might also involve us in speaking out not only about what we can confidently report as research findings but also about the limitations of our research and issues that may not be amenable to empirical research. Thus the critical dimension of research literacy might include foregrounding "the unspeakable" or the "what cannot be said" about the changes and dilemmas associated with ICTs and the new media (Bruce, 1999; Nixon, 2001), including such issues as access, fairness, power, authority, ideology, and meaningful communication (Bruce, 1999). Possibly one of the biggest challenges facing education today is how to (re)introduce such unspeakable topics into our research and professional development and curriculum development agendas.

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