

Thinking About Our Future As Researchers:
New Literacies, New Challenges, And New Opportunities

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ABSTRACT

This paper addresses the changing nature of literacy, as the Internet becomes this generation's defining technology for reading, writing, and communication. It outlines three challenges that confront us and several opportunities that might help us navigate through these challenges. It concludes by describing several steps we must take, as a research community, to prepare our students for the new literacies that will define their future.

AUTHORS BIO

The New Literacies Research Team is a continually evolving consortium of professors, graduate researchers, school districts, organizations, policy makers, teachers, and school leaders who seek to prepare students for the new learning and literacy skills required by the Internet and other information and communication technologies. We engage in systematic study to define what students need to learn to use the Internet effectively for literacy and learning. We also study how best to assess and teach these new skills. What defines us is our extraordinary collaborative approach, our high standards, and our commitment to K-12 schools. Jill Castek and Laurie Henry are currently doctoral candidates in Educational Psychology; Julie Coiro is Assistant Research Professor in Education; Douglas K. Hartman is Professor of Education; Donald J. Leu is the John and Maria Neag Chair of Literacy and Technology; and Lisa Zawilinski is a doctoral student in Curriculum and Instruction.

Thinking About Our Future As Researchers:

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A perfect storm is taking shape in reading research and instruction. This storm is not over the horizon, it is not even on the horizon. Instead, as new technologies transform the nature of literacy, it confronts us on a daily basis, impacting every student, every teacher, every teacher education program, every assessment instrument, and every state's reading standards. Ironically, most of us are not aware of the storm that rages around us as new technologies redefine what it means to be literate in the 21st century.

Why has this storm appeared now? Events have conspired to simultaneously bring together three challenges that we must recognize and begin to address. Each profoundly impacts our ability to prepare students for the reading and writing demands that will define their future.

Today, we would like to outline those challenges. Then, we will explore several opportunities that can help us to weather this storm, should we take advantage of them. Finally, we will outline steps that we might take together to advance our research field in order to better serve the literacy needs of teachers, students, parents, and our increasingly global community.

In a world in which the Internet has become this generation's defining technology for literacy and learning, we will require bold new thinking to reconceptualize our field. We hope to initiate that process.

THREE CHALLENGES THAT CONFRONT READING RESEARCH

The Challenge of Capacity

The National Research Council (1999, 2000, 2002) has recently concluded that a century of educational research has yet to produce an adequate research base to systematically, cogently,

and consistently inform instruction, public policy, teacher education, and assessment in our nation. The lack of a research base is driven by the lack of adequately trained young researchers. Our graduate programs have not yet produced sufficient numbers of doctorates in education who have been adequately trained to make research and development their primary activity in the academy (National Occupational Research Center, 2004). According to survey data collected by the National Opinion Research Center, only seven percent of doctorates in education list research and development as their primary postdoctoral activity (Hoffer, et al., 2004).

The capacity challenge we see in education, generally, appears even more profoundly within the specific area of reading research, the area in education which many might suggest has the longest and richest historical tradition of research (cf. Chall, 1965; Gates, 1921; Gray, 1984; Huey, 1908; E.L. Thorndike, 1917; R. L. Thorndike, 1973-74). One has only to observe the firestorm that recently erupted around the report of the National Reading Panel (National Institute of Child Health and Human Development [NICHD], 2000) to suggest that our research base in reading is not yet adequate to consistently inform instruction.

As in the general field of education, the lack of an adequate research base specifically in reading education is driven by the lack of adequately trained young researchers. Despite its central role, reading research produces relatively few doctorates and channels the fewest number of those who complete the doctorate into research and development activities (National Occupational Research Center, 2004). As a result, we face a shortage of new colleagues entering our research ranks.

In the 2003-2004 academic year, for instance, there were 645 university faculty positions advertised in the U.S. that required expertise in the conduct of reading research as a job requirement, but only 84 doctorates were awarded that year with a reading research focus

(Hartman, 2004). The pattern in preceding and subsequent years has been similar: the U.S. has a critical shortage of highly qualified reading researchers.

Today, intense global economic competition (Friedman, 2005) makes learning to read and use information sources more important to success than ever before, yet we have an inadequate research base on which to make public policy decisions and a desperate shortage of new doctoral students to remedy the situation. Our research capacity is woefully inadequate, just at the time when we require it the most.

The Challenge Of Change

The challenge of capacity is complicated by the challenge of change: New technologies for information and communication regularly redefining what it means to be literate. Despite increasing recognition that the Internet will be central to our lives in the 21st century (Hartman, 2000; Partnership for 21st Century Skills, 2003), we have hardly any research into the nature of online reading comprehension and communication. Indeed, despite both informed speculation (Coiro, 2003; Henry, 2005; RAND Reading Study Group [RRSG], 2002; International Reading Association [IRA], 2002) and evidence (Coiro & Dobler, in press; Coiro, 2007; Henry, 2006; Leu, Castek, Hartman, Coiro, Henry, Kulikowich, & Lyver, 2005) to the contrary, our field often assumes that online reading comprehension is isomorphic with offline reading comprehension (Leu, Zawilinski, Castek, Banerjee, Housland, Liu, & O'Neil, in press). Most importantly, we seldom prepare new scholars to study the new dimensions of reading that take place online.

Why should this be an important area of research? Put simply, the nature of reading comprehension has changed and we have little research to direct either our instruction or our understanding of this area. The RAND Reading Study Group (2002) has summarized the issue:

“... accessing the Internet makes large demands on individuals’ literacy skills; in some cases, this new technology requires readers to have novel literacy skills, and little is known about how to analyze or teach those skills.” (p. 4).

The issue is not unimportant. More than one billion individuals have Internet access (de Argaez, 2006; Internet World Stats: Usage and Population Statistics, n.d.). One-sixth of the world’s population is now reading and writing online, redefining what it means to be literate in an online world.

These Internet readers construct meaning from their reading experiences on the Internet in ways that differ from how reading takes place within the pages of a book; additional skills and strategies are required (Leu, Zawilinski, Castek, Banerjee, Housland, Liu, & O’Neil, in press). We know little about these difference but, if you have any doubt that online reading differs from offline reading, simply view the videos we have placed on the Internet of three different readers, reading on the Internet. These are available at: <http://www.newliteracies.uconn.edu/reading.html> The online videos illustrate the new strategies readers require as they make choices about where to go and what to believe, constructing meaning during online reading.

We can see the changes talking place to reading reflected in data on Internet use within school settings, homes, and the workplace:

- In 1994, only 3% of all K-12 classrooms in the U.S. had Internet access; today 93% do (Parsad, Jones, & Greene, 2005).
- In 2004, nearly 75% of all households in the U.S. had Internet access (Neilson/Net Ratings, 2004).

- Eighty-seven percent of all students between the ages of 12 and 17 in the U.S. report using the Internet; nearly 11,000,000 do so daily (Pew Internet and American Life Project, 2005).
- More than 90% of students between the ages of 12 and 17, with home access to the Internet, report using the Internet for homework and over 70% used the Internet as the primary source for information on their most recent school report or project (Pew Internet & American Life Project, 2001).
- In 2005, 93% of workers in the U.S. in companies with more than 100 employees reported using the Internet and other online information resources in the workplace (Harris Interactive Inc., 2005).

It is clear that the Internet has become a vital new dimension of reading (International Reading Association, 2002; Lebo, 2003; Parsad, Jones, & Green, 2005; U. S. Department of Commerce, 2002).

Despite this recognition, there is relatively little understanding of, or consensus about, how reading comprehension instruction should be conceptualized or conducted in relation to online information (Coiro, 2003; RRSg, 2002). As a result, little instruction in the new demands of online reading comprehension takes place in schools (Karchmer, 2001; Leu, 2006). This shortcoming is due in large measure to two related observations: (a) we know little about the new reading comprehension skills and strategies that are required on the Internet (International Reading Association, 2002; RRSg, 2002) and (b) there is little research on instructional methods dedicated specifically to enhancing comprehension of informational texts on the Internet (Coiro, 2005).

While we are beginning to establish a research base in the reading of traditional texts (NICHD, 2000; Biancarosa & Snow, 2004), there is hardly any research, yet, on the nature of reading comprehension and learning on the Internet and with other information and communication technologies (ICTs). While we have few, new, reading researchers graduating each year with doctorates who seek careers that focus on research and development, we have even fewer researchers prepared to investigate how to best integrate the new reading skills required on the Internet into classroom instruction, assessments, or public policies (Coiro, 2003; Leu, 2006; Leu, et. al, 2004; Partnership for 21st Century Skills, 2003).

That failure has important consequences for education in the twenty-first century because academic achievement is dependent on the ability to read, comprehend at high levels (Alexander & Jetton, 2002; Bransford, Brown, & Cocking, 2000), and solve problems (Dochy, Segers, Van den Bossche, & Gijbels, 2003) and the Internet is an increasingly important source of information (Lyman, & Varian, 2003). Most importantly, students with limited reading comprehension skills struggle with learning in school and are more likely to drop out (Finn, 1989; 1993; Wylie & Hunter, 1994) thus limiting their ability to fully seize life's opportunities for themselves and limiting their contributions to society (Thompson, Mixon, & Serpell, 1996). That challenge may increase as reading on the Internet becomes increasingly important and if we continue to fail to support students with online reading.

There can be little doubt that the Internet has rapidly become an important part of our daily lives (Lebo, 2003; Leu, et al., 2004; U.S. Department of Commerce, 2002). Reading on the Internet appears to require new skills and strategies yet we know far too little about them. We believe that we must begin to confront the challenge of change with an intensive research agenda to study online reading comprehension.

The Challenge Of Those Who Need Our Help The Most

The challenge of capacity and the challenge of change are important elements of the storm that has hit our shore. The greatest challenge of all, however, may be the challenge of those who require the most support with online comprehension in schools because they have access to the Internet at home the least.

In an age of No Child Left Behind (No Child Left Behind Act of 2001, 2002) and increased attention to reading, our assessments of reading achievement in the U.S. have not kept up with the reading skills required by the Internet. Not a single state reading assessment, required by No Child Left Behind measures students' ability to read search engine results; not a single state measures students' ability to read online to locate information; not a single state measures student's ability to critically evaluate information on the internet; not a single state measures students' ability to synthesize information online from disparate sources, and not a single state allows all students to use a word processor for their state writing assessment (Coiro, 2005; Leu, 2006, Leu, Ataya, & Coiro, 2002).

The compounded result is that few students are being supported in developing the new literacies of online reading comprehension in school classrooms (Karchmer, 2001; Leu, 2006). The problem is greatest in our poorest school districts, the ones under the greatest pressure to raise reading test scores on assessments that have nothing to do with the Internet.

Because of traditionally low patterns of reading performance, poor urban and rural school districts face enormous pressure to achieve adequate yearly progress on print-based reading skills required by No Child Left Behind legislation. As a result, schools most at risk must focus complete attention on the instruction of more traditional reading experiences, abandoning any instruction in the skills required for reading online: asking essential questions, searching for

online information, critically evaluating online information, synthesizing online information, or communicating online. *It is the cruelest irony of No Child Left Behind that students who need to be prepared the most at school for an online age of information, are precisely those who are being prepared the least.*

This challenge is not inconsiderable. Eight million U.S. adolescents are considered illiterate (Biancarosa & Snow, 2004). Almost a third of adolescents cannot read at basic levels (National Center for Educational Statistics, [NCES], 2003). Moreover, nearly twice the number of white, economically advantaged students perform above the basic level as their economically disadvantaged peers, those with the least Internet access at home. Moreover, this gap is increasing over time (NCES, 2003).

With the new reading skills that the Internet requires, the reading achievement gap will only get larger as online reading experiences become more central to our literacy worlds. In the end, we appear to spend, know, and do little to help readers most at risk of dropping out of school, those in poor urban and rural school districts. Most importantly, we have not yet prepared a generation of highly trained researchers to focus their attention primarily on pursuing studies required to inform classroom reading instruction in ways that prepare our most economically challenged students to read and learn effectively in an age of global communication and online information.

NEW OPPORTUNITIES

It is ironic, that the U.S., arguably the nation with the most advanced Internet infrastructure, is far behind other nations with integrating the new reading skills required on the Internet into classroom instruction, public policies, or assessment (Leu, 2006; Leu & Kinzer, 2000). New Internet technologies have leveled the playing field for economic competition among nations in

ways not previously possible. Countries like Ireland, China, Finland, Japan, Canada, Australia, India, The Republic of Korea, and others understand this and are much farther along than the U.S. in establishing public policies to prepare their students for the new reading and writing demands of the twenty-first century (Bleha, 2005; Friedman, 2005). Their students are being prepared for the reading comprehension demands of workplaces in a globalized, information economy, often more thoroughly than we have considered preparing students in our own nation (Leu, 2006).

Despite the leveling of the global arena, itself presenting us with additional challenges to consider in the U.S., we see some opportunities in the current state of research in our field.

The Emergence of New Theoretical Perspectives

One opportunity we have consists of growing work in the development of better theories that will help us to better understand the questions we should ask. A number of different research communities have begun to explore the changes that new technologies, and the social practices they engender, bring to literacy. Scholars from disciplines such as cultural anthropology (Markham, 1998; Street, 2003; Thomas, forthcoming), sociolinguistics (Cope & Kalantzis, 2003; Gee, 2003; Kress, 2003; Lemke, 1998), cognitive science (Mayer, 2001), and information science (Bilal, 2000; Hirsch, 1999) have identified changes to literacy as they study the consequences for their individual areas of study. These fields are developing new ways of looking at the problem. As this takes place, a new perspective about the nature of literacy is beginning to emerge. This perspective, often referred to as “new literacies,” is still in its initial stages but it is clear to most that it will be a powerful one, redefining what it means to be literate in the 21st century (Lankshear & Knobel, 2003; Leu, et. al, 2004).

“New literacies” is highly contested space however; the construct means many different things to many different people. To some, new literacies are seen as new social practices (Street, 1995; 2003) that emerge with new technologies. Some see new literacies as important new strategies and dispositions required by the Internet that are essential for online reading comprehension, learning, and communication (Coiro, 2003; Leu, et. al, 2004). Others see new literacies as new Discourses (Gee, 2003) or new semiotic contexts (Kress, 2003; Lemke, 2002) made possible by new technologies. Still others see literacy as differentiating into multiliteracies (The New London Group, 2000) or multimodal contexts (Hull & Schultz, 2002) and some see a construct that juxtaposes several of these orientations (Lankshear & Knobel, 2003). When you combine these uses of “new literacies” with an earlier use of the term by the New Literacies Study Group, and terms such as ICT Literacy (International ICT Literacy Panel, 2002), informational literacy (Hirsch, 1999; Kuiper & Volman, in press; Webber & Johnson, 2000), the construct becomes even more challenging to understand. However, most would agree there are at least four defining characteristics of an emerging new literacies perspective.

First, new technologies for information and communication and new environments for their use require us to bring new potentials to literacy tasks that take place within these technologies. While they may differ on the construct they use, each set of scholars would probably agree that the Internet and other new ICTs require new skills, strategies, and dispositions for their effective use.

Second, new literacies are central to full civic, economic, and personal participation in a globalized community. As a result, they become important to study so that we might provide a more appropriate education for all of our students.

Third, new literacies are deictic (Leu, 2000); they regularly change as defining technologies change. The new literacies of the Internet and other ICTs are not just new today, they will be newer tomorrow, even newer next week, and continuously renewed on a schedule that is limited only by our capacity to keep up. Of course, literacy has always changed as technologies for literacy have changed (Manguel, 1996). What is historically distinctive is that by definition, the Internet permits the immediate, nearly universal, exchange of new technologies for literacy. With a single click, a new technology such as Wikipedia can be distributed to everyone who is online.

Finally, new literacies are multiple, multimodal, and multifaceted (Kress, 2003; Lemke, 1998). Thus, they increase the complexity of any analysis that seeks to understand them and will benefit from analysis that brings multiple points of view to understand them (Labbo & Reinking, 2000). It may also suggest that the area is best studied in interdisciplinary teams as questions become far too complex for the traditional single investigator model (Coiro, Knobel, Lankshear, and Leu, in press).

We are using this emerging notion of new literacies as we conduct work on the nature of the new literacies of online reading comprehension, especially in classroom contexts for learning. To guide our work, we have been using this theoretical definition:

“The new literacies of the Internet and other ICT include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing information and communication technologies and contexts that continuously emerge in our world and influence all areas of our personal and professional lives. These new literacies allow us to use the Internet and other ICT to identify important questions, locate information, analyze the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others.”

(Leu, et. al, 2004, p. 1570)

Within this perspective, new literacies of online reading comprehension are defined around five major functions: 1) identifying important questions; 2) locating information; 3) analyzing information; 4) synthesizing information; and 5) communicating information. These five functions contain the skills, strategies and dispositions that are both transformed by online reading comprehension while, at the same time, appear to somewhat overlap with offline reading comprehension. What is different from earlier models is that online reading comprehension is defined around the purpose, task, and context as well as the process that takes place in the mind of a reader. Readers read to find out answers to questions on the Internet. Any model of online reading comprehension must begin with this simple observation.

Initial studies, now beginning to emerge, are beginning to define a rich and complex picture of online reading comprehension. One study, among highly proficient sixth grade students (Coiro & Dobler, in press), found that online reading comprehension shared a number of similarities with offline reading comprehension but that online reading comprehension also included a number of important differences. A second study (Leu, et. al, 2005), found no significant correlation, among seventh grade students, between performance on a measure of offline reading comprehension and a measure of online reading comprehension (ORCA-Blog) with good psychometric properties. These results also suggest that new skills and strategies may be required during online reading. A third study (Coiro, 2007), using a regression model, found that while offline reading comprehension and prior knowledge contributed a significant amount of variance to the prediction of online reading comprehension, additional, significant variance was contributed by various aspects of students' online reading comprehension ability. The results of

this study are also consistent with the belief that new skills and strategies are required during online reading comprehension.

Additional research is taking place on several, federally funded research grants in the U.S. One of these, the Teaching Internet Comprehension to Adolescents (TICA) Project (Leu & Reinking, 2005), explores the skills and strategies that proficient online readers at the seventh grade level report during online reading comprehension. The project website is available at: <http://www.newliteracies.uconn.edu/iesproject/> Another, funded by the Carnegie Corporation (Hartman, Leu, Olson, & Truxaw, 2005), studies how best to integrate the new literacies of online reading comprehension and learning into the preparation of new secondary teachers in math, science, and English education. This project website is available at: <http://www.newliteracies.uconn.edu/carnegie/index.html> Initiative like these, and others, are likely to provide a clearer picture of how online reading comprehension differs from online reading comprehension.

New Definitions of Doctoral Preparation

We have been discovering a second promising opportunity in a somewhat new approach to doctoral preparation. Centered in the New Literacies Research Lab at the University of Connecticut is the New Literacies Research Team. This is a continually evolving consortium of professors, graduate researchers, school districts, organizations, policy makers, teachers, and school leaders who seek to prepare students for the new learning and literacy skills required by the Internet and other information and communication technologies. We engage in systematic study to define what students need to learn to use the Internet effectively for literacy and learning. We also study how best to assess and teach these new skills. What defines us is our extraordinary collaborative approach, our high standards, and our commitment to K-12 schools.

To be admitted, doctoral students must have previously taught in K-12 classrooms and must publish, or have accepted, a peer-reviewed article in an important educational journal during their first year of doctoral study. We work as colleagues, recognizing the valuable insights that each person brings to the inquiry process. Professors, graduate researchers, teachers, school leaders, and others work shoulder-to-shoulder, equally contributing to the inquiry process and respecting one another as colleagues. Our team currently includes eight doctoral students, four professors, three undergraduates, one project coordinator, five urban school districts in Connecticut, and an extended set of partner organizations, policy makers, teachers, and school leaders who seek to prepare students for the new learning and literacy skills required by information and communication technologies such as the Internet.

The results of our highly collaborative style and high standards for one another has been extraordinary. In the last two years, our three advanced doctoral students have authored one book, twenty-one peer-reviewed articles or book chapters, delivered nineteen invited addresses and forty-eight conference papers, and provided thirty days of professional development to schools, universities, and states departments of education around the nation. They have been invited to institutes at the Universities of Oxford (UK) and Berkeley, serve as reviewers on major journals and conferences, and held positions on major committees in reading research organizations. Moreover, during these two years, they have secured nearly \$100,000 in research grants and their work has contributed to securing nearly \$2,000,000 more. The effects of establishing very high standards, supporting students in reaching them, and working within a collaborative, empowerment model has been stunning. We believe our experience holds great promise as we consider how to better prepare the next generation of researchers that we require.

The Potential Of Collaborative Effort Within Our Larger Research Community

We suspect that the lessons we have learned about collaboration may point to an opportunity today for our larger research community to improve the collective impact of our work. It seems to us that the problems within the study of online reading comprehension and literacy, in a broader sense, are far too complex for any single investigator to fully understand or effectively study. Instead, it has become very clear to us that the study of the more complex issues we face in the study of online reading, writing, and communication demands teams that bring multiple perspectives (Labbo & Reinking, 1999) to the investigation. We believe that we will see increasing numbers of collaborative teams form to study the complicated nature of literacy in an online world that continuously changes as new technologies repeatedly emerge, requiring even newer literacies to fully take advantage of their potential for reading, writing, and communication.

The online tools that have been emerging recently such as blogs, wikis, and other social network tools, as well as the even newer ones that are yet to come, may permit us to bring our collective insights, from many different points of view, to the study of these critical issues. Of course, these new tools will also require each of us to acquire new literacies so that we might benefit from such an online, collaborative approach. We believe that greater collaboration that takes place online will be required if we hope to provide direction to schools and teachers during an age in which the very nature of reading continually changes.

MOVING FORWARD: AN ACTION PLAN

We are convinced that we are in the midst of a perfect storm, driven by a constellation of forces that have come together to present our field with a series of important challenges. The most consequential aspect of this convergence is that, at a time when public policy appears to be focused on supporting our most challenged readers, it is actually preventing those readers from

being prepared for their reading future. Students in our most economically challenged schools should be receiving the most instruction in the new literacies of online reading comprehension since they often have little opportunity to acquire these at home. Instead, the pressure to achieve Adequate Yearly Progress on assessment instruments that have nothing to do with online reading comprehension pressures teachers into abandoning instruction in how to read and comprehend information on the Internet.

What steps might we take within our research community to improve opportunities for all of our students? We believe that a way out of our situation may be found in some of the steps that follow.

Preparing More, And Better Trained, Doctoral Students

Recent statistics reflect the lack of doctorates in reading research who seek careers in research (Hartman, 2004). Our searches for new assistant professors force all of us to live this reality each year. Advertisements for new positions have appeared earlier and earlier until this year when we saw our first search advertised before the fall semester even began. There is intense competition for the very few, highly-trained, doctoral students who seek a career in university research. And, within this group there are even fewer who have been adequately prepared for both quantitative as well as qualitative research methods, something that will be increasingly required if we expect to raise the level of our doctoral preparation programs. Our field would benefit from having higher standards and far greater financial support to recruit the finest young educators into a life of research at a university. This is likely to require financial support that exceeds the limited resources available within universities, schools, and departments. Currently, this often comes from federally funded research grants. It may need to

come in the form of a federal initiative to support doctoral students if we are serious about preparing, to a very high level, a new generation of literacy researchers.

Mentor Doctoral Students Within Collaborative Research Teams

If we acknowledge that research questions are now so complex that they can best be studied within collaborative research teams, then we must prepare doctoral students for these types of scholarly collaborations. It would be incongruous to prepare them for a world in which there is increasing collaboration with programs still based on the single investigator model. Doctoral programs need to be viewed as a rich collaborative effort, with scholarship taking place collaboratively, often with multiple major advisors and multiple students in place of a single advisor working closely with a single student.

Take Advantage Of Online Social Networking Tools To Strengthen Our Research Community

To attack the most pressing and complex research questions that we face will require greater collaborative efforts within our research community. To advance this agenda, we will need to take greater advantage of social networking and communication tools that exist online and new ones as they appear. This will require each of us to become more proficient with the new literacies that we study. This may seem complex and challenging to those of us unfamiliar with the new literacies of online communication.

The nature of the problem may be seen in the examples of good colleagues who regularly post email replies to individuals on listservs, flooding hundreds of inboxes with personal messages. Simple mistakes like this cost time, especially when listservs have large numbers of subscribers.

Those who advance beyond email and listserv technologies to other forms of social networking tools may be rewarded with the potential to increase the significance of the issues that they study and to learn from colleagues who bring new insights to the collective work. They will bring new meaning to the ancient aphorism, “Many hands make light work.”

Such a development, of course, will require universities, traditionally based on the single investigator model, to change its reward system away from favoring only single-authored publications to those, such as this article, that results from joint, collaborative contributions.

Study Online Reading, Writing, And Communication In School Settings

We have gained greatly from important work on students’ use of new technologies for literacy in out-of-school settings (e.g. Alvermann, 2002; Chandler-Olcott & Mahar, 2003). We now require an intensive agenda on how best to support students with the new literacies of the Internet within school settings. We need to know how best to organize instruction in these new literacies so that those who do not have access to important new ICTs outside of school receive the best possible instruction within school on their effective use. We have far more research on out-of-school use of new literacies and far less on in-school use. We need to reverse that situation, mindful of the knowledge that we have already acquired from out-of-school contexts.

Recognize The Issue As Systemic

If we seek to fully integrate the new literacies of the Internet and other ICTs into the classroom, we must begin to understand that the problem will not be solved simply with research. Research will be important, but the challenge we face, like every aspect of school change, is systemic. Since change does not take place in schools without school leaders with the vision and capacity to lead, we must help school administrators to understand the nature of the issue and the solutions we have found. It will also require fundamental change in state standards,

so that new literacies appear within the set of reading and content area standards, not in newly emerging technology standards. It is far too easy for teachers to see technology standards as the responsibility of others, something that happens once a week, down the hall, in a computer lab. Defining the problem as a reading issue will ensure that all teachers see it as part of their responsibility. It will also require these new literacies appear as a central component of our teacher education programs in reading and literacy. Finally, it will require new curricular materials to support teachers' instruction in the classroom. All levels of the educational system must adjust to the new realities of new literacies required to use the Internet and other ICTs effectively.

Focus Considerable Research Effort On Changing Both The Content And The Nature Of Assessment

A critically important aspect of the systemic change we require consists of changes in our assessment instruments. None of the skills of online reading comprehension are currently assessed by state reading tests (Leu, Ataya, & Coiro, 2002). Teachers and school leaders will have a hard time teaching online reading comprehension skills and strategies unless the effects of that instruction will be recognized by assessments that measure growth and diagnose needs. Some initial models are appearing measures (See, for example, Educational Testing Services, 2005). We require much more, however, as well as assessments that evaluate students' ability to read in the unbounded context that the Internet is, not artificial contexts intended to partially replicate the Internet.

Invest in Professional Development

Another critically important aspect of the systemic change we have to negotiate will be the important professional development that must take place in every school. Teachers will have to

become newly literate with new ICTs if we expect them to pass these along to their students. They will also benefit from an understanding of new instructional models that take full advantage of the Internet such as Internet Workshop (Leu, 2002), Internet Project (Leu, Leu, & Coiro, 2004), inquiry models (Eagleton, Guinnee, & Langlais, 2003; Milson & Downey, 2001), and Internet Reciprocal Teaching (Leu & Reinking, 2005). Acquiring new literacies and learning how to integrate them into the classroom will take considerable time and resources. School must be prepared to invest both.

Understand That New Literacies Are Both Multiple And Deictic

Forward movement will also require us to recognize that new literacies do not replace traditional literacies; they transform them, creating new, multiple forms of literacy that must be acquired. Moreover, we will need to also recognize that these new literacies are deictic (Leu, 2000), they continually change as even newer technologies appear, requiring even newer literacies for their effective use. The Internet ensures that any new technology for information and communication will rapidly spread. This creates an important challenges: How does one keep up with all the new literacies that continually emerge? The answer to this question is not yet clear. It may be that students will increasingly need to be prepared to learn how to learn continuously changing literacies from continuously changing technologies, rather than to simply master a fixed set of literacies. Learning how to learn may generalize far better to a landscape of continuous change in technologies and the literacies they require to effectively use them.

Take A Calculated Risk

What we see as necessary will not be easy to accomplish. It requires new ways of thinking, new ways of working, and new ways of teaching. As we have seen, it also requires extraordinary effort from all of us. Most importantly, it will require a calculated risk from you; we need each

of you to bring your expertise to the study of online literacy. It will not be possible if the only ones who make the effort are a small handful of scholars who look at literacy and technology issues. These changes involve all of us. Regardless of what you study in your own work, we require your expertise to bring to the understanding of the changes that will define all of our futures.

**THE FUTURE OF READING RESEARCH WILL BE DEFINED BY THE CHOICES WE
MAKE TODAY**

Some might argue that the changes we have outlined in this paper run great risks. We would argue, however, that not making the changes creates far greater risk. If we do not change, literacy researchers will become increasingly marginalized during the important public policy debates that lie ahead, losing the opportunity to influence events that will take place in school classrooms. Others, outside the literacy research community, will fill the vacuum and define online reading, writing, and communication for us and without us. Research communities in assessment (International ICT Panel, 2002), library and media studies (American Association of School Librarians & Association for Educational Communications and Technology, 1998), educational technology (International Society for Technology in Education, n.d.), and learning research communities (Partnership for 21st Century Skills, 2003) are already beginning to do so. If this trend continues, we will be left alone to study reading issues defined by our past, not our future and, once again, the reading research community will be left out of important public policy decisions that affect classrooms, teachers, and students.

References

- Alexander, P.A., & Jetton, T.L. (2002). Learning from text: A multidimensional and developmental perspective. In M.L. Kamil, P. Mosenthal, P.D. Pearson, and R. Barr (Eds.). *Handbook of reading research, volume III* (pp. 285-310). Mahwah, NJ: Erlbaum.
- Alvermann, D.E. (Ed.). (2002). *Adolescents and literacies in a digital world*. New York: Peter Lang.
- American Association of School Librarians and Association for Educational Communications and Technology. (1998). *Information power: Building partnerships for learning*. Chicago: American Library Association.
- Biancarosa, G., & Snow, C. (2004). *Reading next: A vision for action and research in middle and high school literacy, A report to the Carnegie Corporation of New York*. Retrieved November 2, 2004 from <http://www.all4ed.org/publications/ReadingNext/>
- Bilal, D. (2000). Children's use of the Yahoo! search engine: Cognitive, physical, and affective behaviors on fact-based search tasks. *Journal of the American Society for Information Science*, 51, 646-665.
- Bleha, T. (May, June, 2005). Down to the wire. *Foreign Affairs*. Retrieved December 15, 2005, from <http://www.foreignaffairs.org/20050501faessay84311/thomas-bleha/down-to-the-wire.html>
- Bransford, J.D., Brown, A.L., & Cocking, R.R. (2000). *How people learn: Brain, mind, experience, and school* (expanded edition). Washington, DC: National Academy Press.
- Chall, J.S. (1965). *Learning to read: The great debate*. New York: McGraw-Hill.

- Chandler-Olcott, K., & Mahar, D. (2003). "Tech-savviness" meets multiliteracies: Exploring adolescent girls' technology-mediated literacy practices. *Reading Research Quarterly*, 38, 356-385.
- Coiro, J. L. (2007). *Exploring changes to reading comprehension on the Internet: Paradoxes and possibilities for diverse adolescent readers*. Doctoral dissertation. The University of Connecticut.
- Coiro, J. (2005). Making sense of online text. *Educational Leadership*, 63(2), 30-35.
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *The Reading Teacher*, 56(6). Retrieved November 11, 2005 from http://www.readingonline.org/electronic/rt/2-03_column/index.html
- Coiro, J., & Dobler, E. (in press). Exploring the online reading comprehension strategies used by sixth-grade skilled readers to search for and locate information on the Internet. *Reading Research Quarterly*.
- Coiro, J., Knobel, M., Lankshear, C. & Leu, D. J. (in press). *The handbook of research in new literacies*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Cope, B. & Kalantzis, M. (2003). *Text-made text*. Melbourne, AU: Common Ground.
- de Argaez, E. (January, 2006). *Internet world stats news*, 14. Retrieved February 1, 2006 from <http://www.internetworldstats.com/pr/edi014.htm#3>.
- Dochy, F., Segers, M., Van den Bossche, P., & Gijbels, D. (2003). Effects of problem-based learning: a meta-analysis. *Learning and Instruction*, 13, 533-568.
- Eagleton, M., Guinnee, K., & Langlais, K. (2003). Teaching Internet literacy strategies: The hero inquiry project. *Voices from the Middle*, 10, 28-35.

- Educational Testing Services, (2005). *Measuring College-level information and communication technology proficiency*. ETS: Princeton, NJ. Retrieved November 22, 2005 from http://www.ets.org/Media/Tests/ICT_Literacy/pdf/ICT_Measuring_College_Info_and_Comm.pdf
- Finn, J.D. (1993). *School engagement and students at risk*. Washington, DC: U.S. Department of Education, National Center for Education Statistics [On-line]. Available at: <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=93470>.
- Finn, J.D. (1989). Withdrawing from school. *Review of Educational Research*, 59, 117-142.
- Friedman, T. L. (2005). *The world is flat: A brief history of the twenty-first century*. New York: Farrar, Straus & Giroux.
- Gates, A. 1921. An experimental and statistical study of reading and reading tests. *Journal of Educational Psychology*, 12, pp. 303-14.
- Gee, J. P. (2003). *What video games have to teach us about learning and literacy*. New York: Palgrave Macmillian.
- Gray, W. S. 1984. *Reading: A research perspective, 1881-1941*. Newark, NJ: International Reading Association
- Harris Interactive Inc. (2005). Web@work survey 2005. Retrieved March 13, 2005 from <http://www.websense.com/company/news/research/webatwork2005.pdf>
- Hartman, D.K. (2004). *An analysis of the employment opportunities for reading, language arts, and literacy faculty in higher education during the 2003-2004 academic year*. A research paper presented at the 54th Annual Meeting of the National Reading Conference, San Antonio, TX.

- Hartman, D.K. (2000). What will be the influences of media on literacy in the next millennium. *Reading Research Quarterly, 35*, 280-282.
- Hartman, D., Leu, D.J., Olson, M.R., Truxam, M.P. (2005). Reading and writing to learn with the “new literacies”: Preparing a new generation of teachers and researchers to develop literate American adolescents. Grant proposal funded by Carnegie Corporation of New York.
- Henry, L.A. (2006). SEARCHing for an answer: The critical role of new literacies while reading on the Internet. *The Reading Teacher, 59*, 614-627.
- Henry, L.A. (2005). Information search strategies on the Internet: A critical component of new literacies. *Webology, 2*. Retrieved November 15, 2005 from <http://www.webology.ir/2005/v2n1/a9.html>
- Hirsh, S.G. (1999). Children’s relevance criteria and information seeking on electronic resources. *Journal of the American Society for Information Science, 50*, 1265-1283.
- Hoffer, T.B., S. Sederstrom, L. Selfa, V. Welch, M. Hess, S. Brown, S. Reyes, K. Webber, and I. Guzman-Barron. (2003). *Doctorate Recipients from United States Universities: Summary Report 2002*. Chicago: National Opinion Research Center.
- Huey, E.B. (1908). *The psychology and pedagogy of reading: With a review of the history of reading and writing and of methods, texts, and hygiene in reading*. New York: Macmillan
- Hull, G., & Schultz, K. (2002). *School's out! Bridging out-of-school literacies with classroom practice*. New York: Teachers College Press.

- International ICT Panel (2002). *Digital transformation: A framework for ICT literacy*. Princeton, NJ: Educational Testing Service. Retrieved December 5, 2005 from <http://www.ets.org/research/researcher/ICT-REPORT.html>
- International Reading Association. (2002). Integrating literacy and technology in the curriculum: A position statement. Newark, DE: International Reading Association.
- International Society for Technology in Education. (n.d.). *National foundation standards for all students*. Retrieved December 5, 2005 from <http://cnets.iste.org/currstands/cstand-netss.html>
- Internet world stats: Usage and population statistics*. (n.d.) Retrieved October 25, 2005 from <http://www.internetworldstats.com/stats.htm>.
- Karchmer, R. A. (2001). The journey ahead: Thirteen teachers report how the Internet influences literacy and literacy instruction in their K–12 classrooms. *Reading Research Quarterly*, 36, 442–467.
- Kress, G. (2003). *Literacy in the New Media Age*. London & New York: Routledge.
- Kuiper, E. & Volman, M. (in press). The web as a source of information for students in K-12 education. In J. Coiro, M. Knobel, C. Lankshear, D. Leu (Eds.), *Handbook of research on new literacies*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Labbo, L. D., & Reinking, D. (1999). Negotiating the multiple realities of technology in literacy research and instruction. *Reading Research Quarterly*, 34, 478-492.
- Lankshear, C. and Knobel, M. (2003). *New Literacies*. Buckingham: Open University Press.
- Lebo, H. (2003). *The UCLA Internet report: Surveying the digital future*. Los Angeles UCLA Center for Communication Policy. Retrieved May 12, 2003 from <http://www.ccp.ucla.edu>.

- Lemke, J. L. (1998). Metamedia Literacy: Transforming Meanings and Media. In D. Reinking, M.C. McKenna, L. D. Labbo, & R.D. Kieffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. 283-301). Mahwah, NJ: Erlbaum.
- Leu, D.J. (2006). New literacies, reading research, and the challenges of change: A Deictic perspective. In J. Hoffman, D. Schallert, C. M. Fairbanks, J. Worthy, & B. Maloch (Eds.) *The 55th Yearbook of the National Reading Conference*. (1-20). Milwaukee, WI: National Reading Conference. Video available:
http://www.newliteracies.uconn.edu/nrc/don_leu_2005.html
- Leu, D. J., Jr. (2002). Internet workshop: Making time for literacy. *The Reading Teacher*. 55, 466-472.
- Leu, D. J., Jr. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M. L. Kamil, P. Mosenthal, P. D. Pearson, and R. Barr (Eds.) *Handbook of Reading Research, Volume III* (pp. 743-770). Mahwah, NJ: Erlbaum.
- Leu, D. J., Ataya, R., & Coiro, J. (December, 2002). *Assessing assessment strategies among the 50 states: Evaluating the literacies of our past or our future?* Paper presented at the National Reading Conference. Miami, FL.
- Leu, D. Castek, J., Hartman, D., Coiro, J., Henry, L., Kulikowich, J., Lyver, S. (2005). *Evaluating the development of scientific knowledge and new forms of reading comprehension during online learning*. Final report presented to the North Central Regional Educational Laboratory/Learning Point Associates. Retrieved May 15, 2006 from <http://www.newliteracies.uconn.edu/ncrel.html>.

- Leu, D. J., Jr. & Kinzer, C. K. (2000). The convergence of literacy instruction and networked technologies for information and communication. *Reading Research Quarterly*, *35*, 108-127.
- Leu, D.J., Jr., Kinzer, C.K., Coiro, J., Cammack, D. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. In R.B. Ruddell & N. Unrau (Eds.), *Theoretical Models and Processes of Reading, Fifth Edition* (1568-1611). International Reading Association: Newark, DE. Retrieved October 15, 2005 from http://www.readingonline.org/newliteracies/lit_index.asp?HREF=/newliteracies/leu
- Leu, D. J., Jr., Leu, D.D. & Coiro, J. (2004). *Teaching with the Internet: Lessons from the classroom*, 4th Edition. Norwood, MA: Christopher-Gordon Publishers, Inc.
- Leu, D. J. & Reinking, D. (2005). *Developing Internet Comprehension Strategies Among Adolescent Students At Risk to Become Dropouts*. Proposal submitted to the U. S. Department of Education, Institute of Education Sciences. Washington, D.C.
- Leu, D. J., Zawilinski, L., Castek, J., Banerjee, M., Housand, B., Liu, Y., and O'Neil, M. (in press). What is new about the new literacies of online reading comprehension? In A. Berger, L. Rush, & J. Eakle (Eds.). *Secondary school reading and writing: What research reveals for classroom practices*. National Council of Teachers of English/National Conference of Research on Language and Literacy: Chicago, IL.
- Lyman, P. & Varian, H. R. (2003). *"How Much Information 2003?"* Berkeley: University of California, Berkeley. Available at <http://www.sims.berkeley.edu/research/projects/how-much-info-2003/>
- Manguel, A. (1996). *A history of reading*. New York: Viking.

- Markham, A. (1998). *Life online*. Walnut Creek, CA: AltaMira Press.
- Mayer, R. (2001). *Multimedia learning*. Cambridge, UK: Cambridge University Press.
- Milson, A.J. & Downey, P. (2001). Using Internet Resources for Cooperative Inquiry. *Social Education*, 65, 144.
- National Center for Education Statistics [NCES] (2003). *The nation's report card: Reading highlights 2003*. Washington, DC: U.S. Department of Education. Retrieved October 15, 2004 from <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2004452>
- National Institute of Child Health and Human Development [NICHD] (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction*. (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.
- National Occupational Research Center (2004). *Survey of Earned Doctorates*. Washington, D.C., NORC. Retrieved on July 1, 2006 from <http://www.norc.uchicago.edu/issues/docdata.htm>
- National Research Council (2002). *Scientific research in education*. Committee on Scientific Principles for Education Research. R.J. Shavelson and L. Towne (Eds.). Center for Education. Division of Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.
- National Research Council. (2000). *How people learn: Brain, mind, experience and school*. Committee on Developments in the Science of Learning. J. Bransford, A. Brown, and R. Cocking (Eds.). Committee on Learning Research and Educational Practice. S. Donovan, J. Bransford, and J. Pellegrino (Eds.). Commission on Behavioral and Social Sciences in Education. Washington, DC: National Academy Press.

- National Research Council. (1999). *Improving student learning: A strategic plan for education Research and its utilization*. Committee on a Feasibility Study for a Strategic Education Research Program. Commission on Behavioral and Social Sciences and Education. Washington, DC: National Academy Press.
- Nielsen/NetRatings (2004). *Three out of four Americans have access to the Internet, according to Nielsen/NetRatings*. Retrieved March 18, 2004 from http://www.nielsen-netratings.com/pr/pr_040318.pdf.
- No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1425 (2002). Retrieved December 10, 2003, from <http://www.ed.gov/policy/elsec/leg/esea02/index.html>
- Parsad, B., Jones, J., & Greene, B. (2005). *Internet access in U.S. public schools and classrooms: 1994-2003*. U. S. Department of Education. Washington, D.C.: National Center for Educational Statistics. Retrieved October 15, 2005 from <http://nces.ed.gov/pubs2005/2005015.pdf>
- Partnership for 21st Century Skills. (2003). *Learning for the 21st Century*. Washington, DC: Partnership for 21st Century Skills. Retrieved October 15, 2005 from http://www.21stcenturyskills.org/images/stories/otherdocs/P21_Report.pdf
- Pew Internet & American Life Project (2005). *Teens and Technology*. Retrieved April 15, 2006: <http://www.pewinternet.org/topics.asp?c=4>.
- Pew Internet & American Life Project (2001). *The Internet and education: Findings of the Pew Internet & American Life Project*. Retrieved October 15, 2005 from http://www.pewinternet.org/report_display.asp?r=67.
- RAND Reading Study Group [RRSG]. (2002). *Reading for understanding: Toward an R&D program in reading comprehension*. Santa Monica, CA: Rand.

- Street, B. (2003). What's new in new literacy studies. *Current issues in comparative education*, 5(2), 1-14.
- Street, B. (1995). *Social literacies: Critical approaches to literacy in education, development and ethnography*. London: Longman.
- The New London Group. (2000). *Multiliteracies: Literacy learning and the design of social futures*. London: Routledge.
- Thomas, A. (in press). Cyberspace, cybercommunity, cyberculture, cybercitizenship. In J. Coiro, M. Knobel, C. Lankshear, D. Leu (Eds.), *Handbook of research on new literacies*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Thompson, R., Mixon, G., & Serpell, R. (1996). Engaging minority students in reading: Focus on the urban learner. In L. Baker, P. Afflerbach & D. Reinking (Eds.), *Developing engaged readers in school and home communities* (pp. 43-63). Mahwah, NJ: Lawrence Erlbaum Associates.
- Thorndike, E.L. (1917). Reading as reasoning. *Journal of Educational Psychology*, 8, 323-332.
- Thorndike, R.L. (1973-1974). Reading as reasoning. *Reading Research Quarterly*, 9, 135-147
- U.S. Department of Commerce: National Telecommunications and Information Administration (2002). *A nation online: How Americans are expanding their use of the Internet*. Washington, DC: U.S. Department of Commerce.
- Webber, S. & Johnson, B. (2000). Conceptions of information literacy: New Perspectives and implications. *Journal of Information Science*, 26, 381-397.
- Wylie, V.L., & Hunter, W.A. (1994). *The dropout problem: Can schools meet the challenge?* NASSP Bulletin, 78, 74-80.

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