Web 2.0 Literacy and Secondary Teacher Education

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Abstract

Literacy skills honed from reading books and writing papers has long been recognized as invaluable to building and sustaining intellect. Educators are charged with strengthening literacy programs, and they typically rely on conventional practices and increased time focusing on text-based media to do so, yet their efforts have not significantly increased test scores (Baer, Baldi, Ayotte, & Green, 2007; U.S. Department of Education, 2005). At the same time, these traditional classrooms neglect the rich digital literacy opportunities Web 2.0 tools offer to improve literacy programs and meet individual needs. This paper explores issues surrounding definitions of "new literacy" practices as they relate to Web 2.0 tools while drawing on pertinent, emerging research to discuss the value of integrating digital literacy applications in K–12 and higher education classrooms. (Keywords: digital literacy, Web 2.0, teacher education, new literacy practices)

Introduction

The Internet has posed a new challenge for educators concerned with teaching students the fundamentals of literacy. The extraordinary technological advancements and tools online, with a myriad of opportunities for everyone connected to participate in a multimodal world, extend expectations for teachers and learners wishing to navigate the "new world" of literacy. Moreover, it has been widely suggested that today's students require a new set of literacy skills in the 21st century (Gee, 2009; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006; Jones-Kavalier & Flannigan, 2008; Palfrey & Gasser, 2008; Partnership for 21st Century Skills, 2004).

This paper briefly examines research describing current classroom literacy practices in the United States and broad research attempting to define new literacy practices influenced by the mainstream emergence of Web 2.0 technologies. Drawing on the work of Gee (1996) and Kress (2003), who imply that literacy is increasingly social and multimodal, we suggest a need exists to further examine the potential value of incorporating digital media to *augment* curricula while acknowledging current research offers no clear-cut method to determine best practices. Although many examples of Web 2.0 technologies' use in educational settings are gaining recognition (Anderson, 2007; Johnson, Levine, & Smith, 2007; 2008; 2009; Richardson 2006), few are studied, signifying that its novelty precludes a firm solution providing researched, credible professional development models to emulate.

In light of this, we offer a snapshot of what schools and higher education institutions might employ to capitalize on digital literacy and suggest that examining current grassroots efforts toward implementing these literacies may be the place to begin.

Literacy Practices in Conventional Classrooms

Linguistic literacy skills honed from reading books and writing papers has long been recognized as invaluable to building and sustaining intellect. In traditional K–12 classrooms, literacy practices and interactions primarily occur individually, face to face, or in small, predetermined social groups. Current program methods, such as Readers Workshop (Hagerty, 1993) and Six Traits of Writing, continue to dominate fundamental language curricula (Northwest Regional Education Laboratory [NWREL], 2001; NWREL, 2008) and provide opportunities to read, respond, explore, and discuss various genres of literature in classrooms across the United States. Standards-based reform and No Child Left Behind legislation promote written text as proof of literacy.

When conducting studies to measure literacy for international comparisons, the National Center for Education Statistics (Campbell, Kelly, Mullis, Martin, & Sainsbury, 2001) defines reading literacy as "the ability to understand and use those written language forms required by society and/or valued by the individual. Young readers can construct meaning from a variety of texts. They read to learn, to participate in communities of readers in school and everyday life, and for enjoyment."

Conventional reading programs have always focused on comprehension of print and application of written literacy skills to advance sense making and proficiency. Comparatively speaking, visual literacy has only recently gained acceptance as an essential component of literacy programs, and even then it is typically limited to static images such as diagrams, charts, maps, and photos. Jennifer Stone reminds researchers and educators alike "that a view of literacy that merely addresses the print-based aspects of text fails to capture the complexity of literacy," and further suggests, "The overwhelming focus of literacy theory and pedagogy on the primacy of print over other modes has left literacy scholars and educators hard-pressed" (Stone, as cited in Knobel & Lankshear, 2007, pp. 51–52).

Comprehension built through readers' interaction with text afforded in a context of classroom routine and ritual, in a similar vein, anchors most primary and secondary school programs. Teachers, administrators, and academia strive to find ways to engage and challenge students to develop literacy skills for participation in contemporary global society. As the Progress in International Reading Literacy Study (Baer, Baldi, Ayotte, & Green, 2007) reports, nearly 70% of American K–4 educators teach reading more than six hours per week, which is significantly higher than the international average of 25%. Data gleaned from administrator responses indicate that 95%—a full 15 percentage points higher than the international average—of schools maintain an informal reading program. Yet, despite U.S. educators' efforts to increase instructional time teaching reading and writing, fourth grade reading literacy has not improved

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(Baer et al., 2007). Although students may learn to decode in the early grades, this often fails to translate into reading for meaning (Gee, 2005). Educational theorists such as James Paul Gee point to this common trend as the "fourth grade slump, where children who have learned to read at an early age begin to demonstrate a learning drop-off when confronted by the complex language demands of science, math, and social studies (Chall, Jacobs, & Baldwin 1990 as cited in Gee, 2005, p. 23)." Without question, schools are concerned with improving literacy practices, yet increased time with texts and writing in schools has not consistently improved literacy rates.

Broadening the Definition of Literacy

What has been called into question in this era of unprecedented technological innovation is exactly what constitutes "literacy." Although reading and writing text are undeniably significant components of any language arts or literature program, digital technologies blur the lines of literacy. In the 1990s, literacy addressed the multimodal and hypertextual (and therefore nonlinear) characteristics of the World Wide Web—so-called "Web 1.0" features (O'Reilly, 2005). The mid to late 1990s saw the influence of the 21st-century skills movement, which proposed adding provisions to the curricula to provide students with skills to critically analyze mass media in society. In time, this movement recognized that literacy had moved beyond reading, writing, speaking, and listening to expansive "information and communication technology" literacies including researching, evaluating, creating, collaborating, and integrating information "in order to function in a knowledge economy" (Educational Testing Service, 2002, p. 11). Universities soon began recognizing and attempting to integrate technology literacy skills into their library, media, and technology programs, citing a revolution in literacy based on the recent technological changes. The changing face of digital literacy in this era of rapid technological transformation pushed educators at all levels to examine what it means to be literate through a lens of "new literacies":

> Change increasingly defines the nature of literacy in an information age. Literacy is rapidly and continuously changing as new technologies for information and communication repeatedly appears and new envisionments for exploiting these technologies are continuously crafted by users. (Leu, 2000, p. 743)

The Dynamics of New Literacies

New literacies can be defined as "the ability to solve genuine problems amidst a deluge of information and its transfer in the Digital Age" (Holum & Gahala, 2001, para. 3) but not without some acknowledgment of the social and cultural work of such a definition. As Gee (1996) aptly points out, literacy is a socially contested term, one that "ultimately comes down to moral choices about what theories one wants to hold based on the sorts of social worlds these theories underwrite in the present or make possible in the future" (p. 123). Gee's sociocultural theory of literacy suggests human meaning is constructed through interactions with others that are deeply rooted in social, cultural, political, economic, and historical experiences. Gee frames literacy in terms of *discourses*, which are "socially recognised ways of using language (reading, writing, speaking, listening), gestures, and other semiotics (images, sounds, graphics, signs, codes), as well as ways of thinking, believing, feeling, valuing, acting/doing, and interacting in relation to people and things, such that we can be identified and recognised as being a member of a socially meaningful group, or as playing a socially meaningful role" (Gerber & Lankshear, 2000, p. 101).

Researchers continue to discuss the potential for new literacy practices based on perceived notions of learners' capacity for sense making. In *Literacy in the New Media Age*, Kress (2003) conveys the future of literacy in terms of modes, logics, and affordances. The dominance of images over writing and the display of a screen instead of a book are governed by completely different logics of space and time. He cites the one-dimensional, linear modality in books and print as markedly different, less-intense affordances of screen and image. According to Kress, books simply cannot provide the same level of multimodal production and interpretation of sound, image, and print through music, graphics, and interactive text as technology. It follows that the affordances of the Internet—real-time information, virtual environments, and wide-reaching exchanges of knowledge—can intensify communication and comprehension and ultimately change literacy.

Consider a student researching a topic using books, periodicals, and newsprint to analyze information, interpret charts and graphs, and view photographs, as well as asking teachers and parents for guidance and finally writing a report to present the information. Then consider a student who researches a topic by accessing hyperlinks from a frequently updated database on the Internet, posting pertinent questions to a blog of expert scientists, reading an interactive map that is updated in real time, viewing and interpreting photographs tagged by other students with critique and commentary, and reporting the information through a scripted and rehearsed podcast format. Although both instances call for comprehension, discussion, analysis, and presentation, the scenarios consist of markedly different modalities, social interaction, and semiotic interpretation. If one accepts Gee's theory of social context and Kress' argument for the centrality of multimodal semiotics to sense making, then one must allow for a broader understanding of comprehension and what it means to be literate that reaches far beyond print media alone.

Web 2.0's Potential to Transform Teaching and Learning

There is no firm definition of Web 2.0; however, a generally accepted notion that research journals, higher education, business communities, and avid Internet users apply highlights a capacity for high user engagement, intellectual rigor, frequent updating, and collective knowledge sharing based on an underlying technological infrastructure of blogs, wikis, podcasts, photosharing, RSS feeds, social bookmarks, and the like (O'Reilly, 2005; Anderson, 2007). Technologically savvy users customize and build their own applications to be shared and modified. What has emerged from Web 2.0 is a perfect storm for its engaged participants: a new, highly participatory culture with broad access to media production tools, meshed with ubiquitous, inexpensive, or free tools. Users capitalize less on consumption and retrieval and more on creating content in spaces such as blogs, wikis, and video-sharing sites. Sharing or posting content is almost effortless on readily available online sites or spaces with social bookmarking, RSS feeds, or tools embedded in social networks. It is the ease and speed that appear to fuel the rapidity of this revolution.

Contemporary definitions of literacy are now being redefined to include Web 2.0 characteristics, which emphasize a collaborative model of content creation fostered by tagging and sharing ideas, editing and remixing media, and collectively solving problems in intensely visual mediums (Ohler, 2009). Web 2.0 technologies relocate "expertise" by broadening the range of information sources available and encouraging collective intelligence through distributed practices of winnowing and sifting rather than single sourcing. Thus, Web 2.0 significantly changes what constitutes literacy, and therefore literacy assessment, in schools. Instead of standardized, individually focused, teacher-mediated curricula, literacy practices surrounding Web 2.0 technologies call for knowledge construction in a collaborative, production-oriented, somewhat nonlinear manner with access to knowledge mediated by its users. This "implicit architecture of participation" (O'Reilly, 2005, p. 2) is changing the way universities and researchers view literacy. However, transforming this view into sustainable preservice or inservice teacher training programs and courses will take time.

The potential of Web 2.0 technologies in teaching and learning environments has caught the attention of universities around the world. As the *Horizon Report* (Johnson, Levine, & Smith, 2008) concludes, Web 2.0 trends in distance education, globalization, digital literacy skills, and collective intelligence are now driving the restructuring of academic programs. How faculty and students perceive "technology" is noticeably different. User-created content, social networking, mobile phones, virtual worlds, new forms of publication, and massively multiplayer educational gaming will "significantly impact college and university campuses within the next five years" (Johnson, Levine, & Smith, 2007, p. 6). For example, current educational uses of video to "rhetorically persuade others and articulate points of view" (Johnson et al., 2008, p. 11) suggest that learning organizations will, within the next year, use video as a mainstay of teaching and learning practice. Video capture, made accessible on popular and inexpensive tools such as cell phones, iPods, and pocket cameras, allows faculty the option of incorporating video data, papers, and projects into curricula. "Video papers and projects are increasingly common assignments. Student-produced clips on current topics are an avenue for students to research and develop an idea, design and execute the visual form, and broadcast their opinion beyond the walls of their classroom" (Johnson et al., 2008, p. 11).

However, there is still a vast amount of practitioner and research work to do before schools are able to infuse their curricula with Web 2.0 technologies. The Joint Information Systems Committee, which investigates the possibilities that *social software* (any Web-based software allowing users to interact and share data) holds for learning and teaching, acknowledges that there is a "significant debate over the alleged advantages and disadvantages of incorporating social software into mainstream education" (Anderson, 2007, p. 1). Anderson's report raises important questions about the value and use of Web 2.0 technologies and education. He provides examples of successful academic uses of wikis, blog, photo sharing, tagging, and bookmarking but then points to the lack of pedagogical research and evaluation of social media in higher education and K–12 settings. Social media's ability to adapt to various learning styles, to captivate students when introduced in schools, and to hold their interest more successfully than more traditional "broadcast" modes of learning has not yet been adequately addressed through scholarly study and evaluation. Web 2.0 technologies challenge participants' ability to recognize and determine what constitutes authentic knowledge and exacerbate issues of shared authorship, privacy, and plagiarism (Anderson, 2007, p. 44; Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006). Such tendencies have implications for teaching and learning at all levels of education.

Research and development of online environments such as virtual worlds and online multiplayer games are providing evidence of complex digital literacy practices surrounding the engaged user's environment (Barab, Arcici, & Jackson, 2005; Barab, Sadler, Heiselt, Hickey, & Zuiker, 2006; Ketelhut, Dede, Clarke, Nelson, & Bowman, in press; Clarke, Dede, Ketelhut, & Nelson, 2006; Steinkuehler, 2006, 2007, 2008; Steinkuehler & Duncan, 2008). These studies, although significant, have not yet translated into substantial teaching training programs. Universities have made noticeable efforts to include Web 2.0 literacy practices in faculty training and both graduate and undergraduate programs, yet no definitive body of research has been published detailing teacher preparation programs and Web 2.0 technologies. Predominately, undergraduate and graduate students find Web 2.0 offerings through library, media, and information studies or in directed technology courses in educational communication and technology programs. In light of this, teacher in-service programs have not been formally charged with including digital literacy in coursework to critically explore Web 2.0 tools on the Internet or investigate implications for practice.

The Digital Gap: Technologically Savvy Students Lack Opportunities at School

As universities tussle with the digital information age and its impact on teacher preparation programs, K–12 school districts are slowly reacting to the extensive gap between teaching staff and their technologically savvy students. As higher education is just beginning to incorporate new technologies into faculty training and coursework, it is not surprising that K–12 teachers appear to be in the early stages of establishing learning connections with their digital-native students. The nonexistent corpus of research detailing teacher preparation programs or current practices with digital literacies makes it difficult to measure their existence or success. Numerous studies have examined teacher-directed use of the Internet, Internet safety, and Internet access (Cuban, 2002; Doherty & Orlofsky, 2001; NCES, 2006; Rakes, Fields, & Cox, 2006; Smith, 2007), and recent studies have probed students' out-of-school Internet practices (Lehnart, Simon, & Graziano, 2001; Levin & Arafeh, 2002; Lenhart & Madden, 2005; Lenhart, Madden, McGill, & Smith, 2007). Studies of in-school access and at-home use, along with discussions of potential learning connections, comprise the largest body of research. In terms of infrastructure, student-to-computer ratios as well as Internet access and speed are greatly improving in school, yet they lag in their ability to keep pace with new digital affordances. At home, younger generations experience communication in a markedly different manner that is denser in content, richer in relationships, and most likely more appealing (Stone, 2007). It appears that teachers and students have not fully experienced Internet technology integration into school curriculums analogous to the multifaceted, production-oriented activities many adolescents and young adults pursue at home. The overall disconnect between readily available technology tools and in-school digital literacy practices remains discouraging.

The National Center for Education Statistics (NCES) report "Teacher Use of Computers and the Internet in Public Schools" (2000), although dated, is the most recent national measure of teacher use of technology in public schools. At that time, teachers reported heavy computer and Internet use for creation of instructional materials, correspondence with colleagues, and administrative tasks. Unsurprisingly, teachers with fewer than nine years of teaching experience were more likely to use computer technology than teachers with 20 years or more (NCES, 2000). Follow-up studies from the U.S. Department of Education focused primarily on ratios of students to instructional computers with Internet access and attention given to in-school availability of inappropriate material on the Internet. By 2005, NCES reported a steady increase in access to broadband and wireless technology in K–12 schools, along with increased access to handheld and laptop technologies. Student-to-computer ratios are nearly four times lower than a decade ago, with one computer available for every three to four students (NCES, 2006). These data suggest that, within the United States, access and speed are becoming important issues for educators. When measuring only information and communication technology access, educational institutions at all levels appear to be closing the digital divide.

Yet current studies reveal the technology gap encompassing skills and training is widening when comparing students' at-home technology use and in-school technology instruction (Levin & Arafeh, 2002; Lehnart & Madden, 2005; Lehnart, Madden, MacGill, & Smith, 2007). Moreover, the affordances of the Internet, and Web 2.0 technologies in particular, continue to redefine literacy and literacy practices as participants of readily available media engage in practices far removed from the traditional focus on print media, textual writing, phonological reading and writing, illustration, and oral language. The expansive influence Internet technologies have had on everyday users has outpaced education's ability to sustain the Internet's newly afforded literacies. Kress' depiction of the literate world of communication dominated by screen and image appears, for the time being, to be a larger reality outside of K–12 education than within.

Table 1: Contrasting Characteristics of Internet Use Within Versus Outside Classrooms

Internet Use Within Classrooms	(Web 2.0) Internet Use Outside Classrooms
Content retrieval and consumption	Content creation and production
Access mediated by teacher	Access unmediated
Production as evidence of consumption	Production as genuine contribution
Enculturation into pre-ordained "culture"	Enculturation into affinity group cultures
Text privileged	Multimodal systems privileged
Teacher as "guide on the side"	Distributed and collective expertise
Individual	Collaborative
User standardization	User customization
Linear, logical, static progression	Nonlinear, logical, dynamic progression

Writing, Technology and Teens, the subject of Lehnart, Arafeh, Smith, and MacGill's (2008) Pew report, details student practices and attitudes toward writing and publishing practices using computer and Internet technology. Prominent findings reveal teens (and parents) consistently view writing as important for success later in life, but did not connect their widely used communications on the Internet or through text messaging as writing. Unsurprisingly, topic relevance, opportunities to write creatively, high expectation, and interested audience members provide writing inspiration. Teen bloggers were found to be prolific writers on- and offline. Although the overall findings suggest teens did not connect technology to increased writing ability, substantial implications for education may arise from teens collectively voicing their opinion that instrumental writing, or writing to achieve a purpose for school or social audiences, is most motivating and pertinent to their lives. Web 2.0 technologies offer broad opportunities to do just that.

As recent as 2007, the Department of Education and the National Institute of Child Health and Human Development sponsored research conducted by the National Institute for Literacy to assist administrators, teachers, and parents to strengthen adolescent literacy. Admittedly not a comprehensive review of literature or research, the report details "methods of building adolescent reading and writing skills in the classroom" (National Institute for Literacy, 2007, p. i). The publication acknowledges that "adolescent learners in the 21st century will read and write more than any other time in human history" (p. i) as they take their place as global citizens sifting through an abundance of information in the digital age and describes and summarizes adolescent literacy research enabling teachers to incorporate strategies into their own content and practice. The document focuses on critical components to developing reading proficiency, assessment, writing, motivation, and needs of diverse learners (p. 2), and it discusses at length direct instruction, paired reading, oral reading, graphic organizers, independent practice, and formative assessment based on proper questioning techniques. A discussion of literacy extending beyond print and simple visual literacy is missing from the publication. Inarguably, research cited within the publication supports important methods for teaching literacy to adolescents. The article's absence of "new literacy practices" in our technologically connected world speaks to the newness of the subject matter of emergent literacies based on developing technologies. Technology in schools is subject to the tradition of schooling itself, which often runs parallel—and at times in direct contradiction—to the affordances of the Internet. Table 1 highlights some of the more salient contradictions.

In K–12 schools, text-based learning and evaluation systems are standard. Despite the decreasing student-to-computer ratios and increased access reported in schools (NCES, 2001; NCES, 2006), some educational researchers tout these findings as superficial, suggesting that computer labs and shared spaces outside of regular classrooms receive the bulk of school computers, and disregard the actual classroom student-to-computer ratios in statistical reporting. (Norris, Sullivan, Poirot, & Soloway, 2003). Library media centers and computer labs offer whole-group instruction but not necessarily convenience or availability, as proximity and scheduling issues prevent large-scale use in some settings. As recent as 2003, 67% of teachers surveyed reported access to computer labs as zero, occasional, or once a week, and access didn't necessarily translate to instructional usage (Norris et. al., p. 6). The one-computer classroom controlled by the teacher, often used as a "center" for drill and practice, information retrieval, or finishing work started in a lab setting, continues to be the prevailing reality in many new-millennium classrooms. Establishing curriculum and practices embracing multimodal student learning drawing on user expertise and customization is not the norm. Traditional classrooms neglect the opportunities that Web 2.0 offer to strengthen literacy programs and meet individual literacy needs in collaborative online settings through authentic content creation opportunities, shared expertise, and dynamic multimodalities. Web 2.0 technologies strain accepted literacy practices as they challenge the teacher-as-gatekeeper of knowledge and the tradition of standardization and individual reward. Although the transmission of "culture" in schooling has always been guided by administrators and teachers, Internet technologies give voice to a radically broader set of cultures and affinity groups. Without a solid body of research to direct augmenting instruction to incorporate digital literacy practices in K–12 classrooms, along with supportive teacher education and training programs, a large-scale shift in practice seems unlikely.

Grassroots Efforts

Despite the lack of significant movement within K–12 technology and literacy programs to include digital literacy practices, a small-scale movement to integrate Web 2.0 technologies within schools appears to be taking place. The *Horizon Report* offers a sampling of current usage, including "secondary school students from five schools in five different countries researching and envisioning the future of education and society. Students shared content through a wiki, then produced nearly 20 short videos about the topics and posted them on YouTube" (Johnson, Levine, & Smith, 2008, p. 11). Similarly, Pew Internet and American Life Project report *Teens and Social Media* (Lenhart, Madden, MacGill, & Smith, 2007) maintains that grassroots video use, YouTube in particular, has risen sharply in the last year. At the end of 2006, 57% of all teens online were watching videos (p. 28), and 14% were posting their own amateur videos (p. 14). Although video content creation and sharing is only one small part of Web 2.0 technologies, it has become a somewhat important one, with significant growth in the use of video-sharing sites across all groups regardless of gender, ethnicity, socio-economic status, or education (Rainie, 2008, p. 2). The increase in all Americans shooting and posting their own videos tripled from 2006 to 2007 alone (p. 3). A

newly released Pew Internet report (Madden, 2009) confirms a continued sharp increase in adults—particularly young adults—watching and sharing videos. Presumably, the rise in popularity of online video sites within all segments of society is already affecting educational institutions as teachers discover utility in augmenting instruction with related video clips or broadcasts.

The explosion of online spaces and tools such as Google Docs, Voicethread, Twitter, Facebook, and Wordle, along with the innovation of cloud computing, or Web-hosting services, is trickling into educational settings. As the most recent *Horizon Report* suggests, "Educational institutions are beginning to take advantage of ready-made applications hosted on a dynamic, ever-expanding cloud that enable end users to perform tasks that have traditionally required site licensing, installation, and maintenance of individual software packages" (Johnson, Levine, & Smith, 2009, p. 12). With easy access and availability, along with cheap data storage, educators are beginning to take notice of the enormous potential for communicating, learning, and problem solving offered via the Internet.

How do K–12 districts change practice to incorporate digital literacy skills? The answer may lie in a structure analogous to Web 2.0 itself. Grassroots efforts encapsulating collective intelligence may be teachers' best bets. An example of Web 2.0 tools shifting practice can be found in a midsized school district in the Midwest. The district was facing a number of changes to its instructional technology program based on the completion of two new intermediate schools with extensive access to technology. Scheduling and staffing modifications and the impending deadline to submit a new library, media, and technology plan called for an examination of the current technology program. In response, a small group of instructional technology teachers from the district began reviewing articles detailing Web 2.0 tools and research describing the gap between what students were able to do at home and what their standards-based, "solid" technology curriculum offered at school. The group decided to rework its technology program to infuse opportunities for Web 2.0 into a scope and sequence of student competencies that were not software or "tool" specific, but instead open ended and research and project oriented. They intended to thread ethics, safety, and responsible computing into the entire K–12 curriculum. When compared to district- and state-level library, media, and technology standards, the student competencies, if satisfied, exceeded standards expectations.

Meeting the "new" student competencies led the team to rewrite the entire 5–8th grade technology curriculum and significantly revamp the K–4 curriculum. The new curricula encompassed skills but foregrounded Web-based learning inclusion of individual or class Internet tools. A K–12 matrix called the Student Competency Worksheet introduced and developed use of blogs, wikis, podcasts, social bookmarks, RSS feeds, and YouTube video. Budgeting reallocation (not increases) and professional development changes were necessary to support the curricula's integration with Web 2.0 technologies. The infusion of Web 2.0 technologies pushed on the philosophical view of blocking students from access to what was previously considered "distracting" or "ineffectual" to opening up sites for educational access (Herro, in progress). A few examples of budgeting, curriculum, professional development, and unblocking initiatives include:

- A subscription to Blackboard at the 9–12th grade level to support online communication and collaboration
- The purchase of 60 iPods to begin offering portability with podcasting
- Graduate-level courses offered in district focusing on research, best practice, and exploration of digital literacies, with content focused on natural integration of Web 2.0 technologies in existing courses
- Written guidelines for class blogging and wikis that include teaching and modeling responsible practice, privacy settings for commenting, and parent permission for K–6 students asked to register for e-mail accounts to access the tools
- A formalized request process to unblock sites for specific periods of time when safety, supervision, and educational value were present
- A directed effort to provide information to the community via newspaper articles, school board presentations, and Web sites or online communication

Consequently, the graduate courses and new guidelines and permissions procedures led to changes in the school board–approved Network Use Agreement. Recognizing that online environments will continue to change, the district believes it is in the initial phase of embracing new literacies conceptualized by Web 2.0 tools. Although the library, media, and technology plan is at best a three-year plan, technologies that may not yet exist will drive future curricula, professional development courses, and budgeting decisions.

Teacher Training Programs: An Understanding of New Media and Content Integration

Whereas grassroots efforts to incorporate digital literacy may provide the initial push needed to move it into classrooms, educators need extensive professional development to learn how to help students' master 21st-century literacy skills. A starting point for teacher training might include components of incorporating new digital-literacy skills into curricula while addressing challenges faced by students as they create or discover content in multimodal, unmediated spaces.

In *Confronting the Challenges of Participatory Culture: Media Education for the 21st Century* (Jenkins, Clinton, Purushotma, Robison, & Weigel, 2006), the authors discuss, as the title suggests, the need for educators to address challenges to help students succeed in an age of new media. Characterizing teens' time spent online as engagement in "a participatory culture" with "relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one's creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices" (p. 3), they argue schools must provide meaningful access to online environments while teaching students to understand the influence and ethical implications of participating in these cultures.

To address opportunities for equal participation, active reflection, and the development of ethical norms, Jenkins et al. outline 11 new media literacies. Defined as "a set of cultural competencies and social skills that young people need in the new media landscape" (p. 4), they charge schools and afterschool programs to foster them, believing they should build them on "the foundation of traditional literacy, research skills, technical skills, and critical analysis skills taught in the classroom" (p. 4). The literacies encompass skills such as:

- *Simulation*: the ability to interpret and construct dynamic models of real-world processes
- *Appropriation*: the ability to meaningfully sample and remix media content
- *Judgment*: the ability to evaluate the reliability and credibility of different information
- *Transmedia navigation*: the ability to follow the flow of stories and information across multiple modalities

- *Negotiation*: the ability to travel across diverse communities, discerning and respecting multiple perspectives, and grasping and following alternative norms (p. 4)

Understanding new media literacies and their implications for participation in a global society is the first step necessary for teacher training. To elucidate understanding of how grassroots efforts and professional development might facilitate teachers in assisting student mastery of new media literacy skills, we provide this example from a study of Web 2.0 technologies integrated in a classroom with adolescent learners (Herro, in progress):

> Reading, discussing, and reflecting on research regarding Web 2.0 technologies and new media literacies led a teacher-researcher to write a curriculum rich in digital literacy skills and integrated with a local school district's social studies standards. Teaming with a classroom teacher who had begun her own grassroots effort to use wikis and podcasts in her classroom, the pair implemented a nine-week, daily unit where students worked in groups using blogs, wikis, podcasts, and social bookmarks. After researching and providing credible evidence for both sides of an argument regarding a global issue, student groups produced a script via a wiki to record a podcast, sync to an iPod playlist with other groups' podcasts, and peer-evaluate one another's work providing justifications for their evaluations. When compared to the 11 new media literacies outlined by Jenkins et al., the unit met most of the competencies. Collegial discussions regarding the effectiveness of the curriculum and potential for modeling led the teachers to offer professional development supporting an approach of providing teachers with opportunities to read and discuss digital literacy research, apply a similar research-design model within their curricular area, and support one another with continued workshops, professional development offerings and informal apprenticeship. The workshops and offerings were met with great enthusiasm, and unsurprisingly, a contingency of "grassroots innovators."

It seems logical for professional development opportunities for teachers to provide an avenue to examine the confluence of research of new literacies, curricular design opportunities afforded by Web 2.0 tools, and existing content standards to determine best practices employing in-school use of new media skills.

New Literacies, New Tensions

We live in an age of incredible technological shift—a period when, outside the classroom, children and young adults have anytime/anywhere access to complex multimodal semiotic resources for their own use, when the media standard is shifting to interactivity in place of top-down broadcast media, and when the line between life online and offline has thoroughly blurred. Such an era of change is fraught with concerns from an older generation over safety, accountability, and oversight. There is a yawning chasm between learning in informal spaces and formal ones, particularly in terms of online technologies. Students as "digital natives" (Prensky, 2001, p. 2) navigate this new world with ease; teachers as "digital immigrants" struggle to keep pace. Ironically, increases in student technological literacies have caused a lockdown and lockout of such technological literacies in schools themselves. District administrators have used concern over online safety and intellectual property rights/fair use, for example, to justify a surge in Internet filters, Internet safety, responsible-use education, and desktop "locks" on computers, creating apprehension in schools. Some consider Internet research and resources outright attacks on the traditional, well-established, and well-accepted logic of static print.

As the research on the efficacy of digital literacy practices is only now emerging, deep tensions remain around the idea of infusing Web 2.0 tools into traditional reading and writing programs. Web 2.0 technologies enable and amplify collaboration and multimodality yet cause uneasiness in school contexts. The distinctly different affordances of Web 2.0 challenge our easy acceptance of traditional modes of communication and push on our time-honored practices of teaching and assessing learning through books and print. K–12 and postsecondary institutions embrace the rhetoric of diversity and collaboration yet continue to consistently reward individual, lone accomplishments. Innovative educators introduce and loosely recognize new literacy practices, but these rarely remain static or stable enough to create long-term learning environments. Truly, preparing students for life in the 21st century will require a restructuring of teacher training programs, a redefinition of literacy practices, and a reworking of traditional print-based curricula. For now, staff development programs fueled by grassroots efforts to use educationally valuable, readily accessible, inexpensive, and profoundly interesting technologies may be the best bet.

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