Computer Mediated Communication and Scaffolding Toward New Literacy in Preservice Teacher Education Courses

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Abstract

The efforts of educators to reduce the digital disconnect that exists between schools and pervasive digital communications and media present problems in developing New Literacies for all involved. Participation gaps among students add a social justice dimension to this work. This paper suggests a typology of scaffolding for language development in preservice teacher education courses incorporating computer-mediated communication (CMC) for pedagogical purposes that are applicable to other contexts. Scaffolding can help develop beginning teachers' digital literacy skills and reduce the participation gap that threatens to create a cultural divide between educators and their increasingly "wired" students. Practical suggestions and lessons learned are included.

Keywords: Assisted performance, pedagogy, digital disconnect, participation gap, social justice, digital genres, text types, Web templates

Introduction

Modern society is undergoing the most profound and ever-accelerating technological transformation in recorded history (Palfrey & Gasser, 2008). A wide-range of computer-mediated communication (CMC) tools (e.g., Wikis, blogs, social networking sites, Twitter) are changing the manner in which humans live, work, and play. Through these and other related technology, humans have greatly expanded their capabilities for instant communication, connectivity to expansive content and information, and delivery of diverse forms of entertainment (Hanson, 2007). The preponderance of online media in popular culture such as YouTube, MySpace, Facebook, Wikipedia, chat rooms, Twitter, instant messaging, and Google Wave (beta) demand that educators and students become skilled users of these media and related electronic tools. This is particularly true of teacher educators striving to contextualize their teaching to match students' experiences and reduce the "digital disconnect" (Levin et al., 2002) between them and schools. More than 60 percent of people in the US have broadband Internet connections at home (Horrigan, 2009); most teenagers access the Internet one or more times a day (Lenhart, et al., 2008); the most assiduous users of YouTube are K-12 children (Marketwire, 2009-a); and 96 percent of the college-aged population make daily use of the Internet (Marketwire, 2009-b). A recent national survey of public school districts reports that almost all schools have Internet connections, and a majority provide online resources for teachers and students, including professional development on integrating technology into their teaching (Gray & Lewis, 2009). Yet, teachers continue to rely almost exclusively in traditional instructional practices (Cuban, 2001; Hodas, 1993), which may be a result of teachers' beliefs (Swain, 2006), classroom management needs (Wright & Wilson, 2009), or a lack of appreciation for the potential of technology as a transformative experience (Dawson, 2006).

Palfrey and Gasser (2008) use the term "digital natives" to describe advanced users of technology who were born after 1980. However, Palfrey and Gasser are careful to note that not everyone born after that date is necessarily an adept user of technology. Differences in required skills and in access to technology between students produce "participation gaps" (p. 15), a serious concern for educators working toward

equity and social justice, beyond attainment of technological skills and meeting standards. The pervasive presence of technology, and particularly the Internet, in the modern world have prompted Donald Leu and his colleagues to propose a "New Literacies" framework. Though they are the first to admit that no clear definition for New Literacies exists, Leu et al. (2004) offer the following working definition:

> The new literacies of the Internet and other ICTs include the skills, strategies, and dispositions necessary to successfully use and adapt to the rapidly changing in-formation 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 ICTs to identify important questions, locate information, critically evaluate the usefulness of that information, synthesize information to answer those questions, and then communicate the answers to others. (p. 1572)

Just as students have traditionally been supported to develop their language and literacy skills in the classroom, learning to use CMC must be an intentional element of contemporary curricula as digitally mediated communication and access to information expand rapidly and full participation in a democratic society demands its daily use.

A profound implication in framing the study of CMC and, particularly, the Internet in education as New Literacies (Leu et al., 2009) in teacher education is that the work transcends traditional subject matter and contexts. Educators are now required to think beyond skills and abilities and consider diverse, rich, context-specific views, such as information and communication technologies (ICT) skills (OECD, 2003) or discourse (Gee, 2007), which Leu et al. (2009) consider instances of new literacies (lower case) within the larger New Literacies (upper case) framework. Furthermore, Gee's (2000) view of literacy as "identity work" (p. 413) coincides with one of two themes in Greenhow, Robelia, and Hughes's (2009) conceptual framework for research on Web 2.0. In their words, "When learners engage in cycles of creation and consumption as part of the participatory Web culture […], they are simultaneously developing online identities" (p. 251).

The aim of this paper is to contribute to the discussion of CMC for teacher education as a new literacy (Leu et al., 2009) by proposing pedagogical strategies derived from scaffolding for second language development. Drawing on Walqui's (2006) conceptual framework for scaffolding instruction for English learners, a summary of general characteristics of scaffolding is presented. This is followed by a description of each scaffolding type in the context of CMC and preservice teacher education courses, including examples when appropriate. The paper ends by describing an example of teaching practice intended to scaffold ICT skills development as instances of new literacy. An important concern behind the motivation to adapt Walqui's scaffolding typology is to address the participation gap (Palfrey and Gasser, 2008) that is common among students. In providing beginning teachers with opportunities to develop new literacies, it is hoped that they in turn will be better prepared to address similar inequities in their classrooms.

General Characteristics of Scaffolding

Walqui (2006) builds upon Bruner and Sherwood's (1976) metaphor of scaffolding as a way to analyze parental interactions with children and focus on language development. Walqui is not alone in highlighting the importance of scaffolding for language development (Gibbons, 2002; Hammond and Gibbons, 2005) or in general (Hartman, 2002; Lee and Smagorinsky, 2000; Tabak, 2004). Nevertheless, Walqui identifies as scaffolding both ritual structures (i.e., planned curriculum and classroom procedures used over time and across activities) and collaborative interaction processes (i.e., responsive and adjusted assistance provided within classroom interactions). As is the case with the building artifact, Bruner and Sherwood's "scaffolding" supports the interactions between teachers and students and among students within the learners' zones of proximal development (ZPD) (Vygotsky, 1978). The metaphor of scaffolding accurately underscores the need for continual adjustments, informed by assessment, observation, and reflection. Thus, whether an educator aims to teach students how to use English for academic purposes or how to compose text on a class Wiki, scaffolding must be dynamic and continuously mediated by the emergent social interactions within the learning context. Walqui cites van Lier (2007) in listing six features of pedagogical scaffolding that can be applicable for any educational setting or context.

The first feature is *continuity*, or the quality of tasks and activities that build on each other, providing sufficient opportunities for students to practice core skills and develop fluency, while gradually exposing them to new ones. Continuity also pertains to the frequency in which students are asked to perform tasks, which in turn depends on the complexity and difficulty of the skills involved. Continuity in a CMC

classroom resides in the sequence, frequency, and gradation of tasks, moving from simpler, familiar, less challenging tasks to increasingly complex, new, and difficult ones. Depending on the students' background and experience, continuity in scaffolding may consist of projects that require students to post a reading reflection as part of a threaded conversation on Wikis, compose a brief entry on an individual blog, or upload a photo or video clip to a class Twitter group. As students become more knowledgeable about their digital environment, they may be asked to create a Web page that incorporates photos, Web-links, and text as a reflection of their increasing levels of ability.

A second feature, *contextual support,* provides students with a safe and supportive environment in which they are encouraged to test their abilities and experiment to achieve a required goal. Instructors must recognize that it is natural for students to be hesitant and cautious when learning new languages or new literacies (Leu et al., 2009). Thus, an important first step in CMC classrooms is to begin by publicly announcing that not all students have facility with digital environments and that they are expected to fall along a wide continuum of skills and interest in their use of technology. Instructors must speak openly about the variety of feelings (e.g., excited, anxious, confident, frustrated, embarrassed, overwhelmed) most people experience in response to digital environs. Further, it is appropriate and expected that students new to CMC will first participate "peripherally" (Lave & Wenger, 1991) and gradually transition to more integrated engagement as they gain control and agency with various digital tools. Because of the capacity of CMC to adjust to individual needs and abilities, contextual support is a scaffolding feature that can be especially powerful.

A third feature of scaffolding, *intersubjectivity*, helps develop supportive relationships among participants in a learning community where mutual engagement and positive rapport are established. CMC has the potential of expanding the time and space for students to construct supportive relationships with others as the burgeoning growth of MySpace, Facebook, and Twitter have demonstrated (Hanson, J. 2007). CMC can be utilized to enhance small and large group interactions as digitally mediated communications are not restricted by the rigid time and physical boundaries of the traditional "brick and mortar" college classroom. Instead, CMC supports asynchronous interactions that complement the face-to-face, in class exchanges.

Yet another feature, *contingency,* accounts for the capacity in scaffolding to respond to learners' growth and actions as well as unexpected events by adjusting the challenge level, procedures, and support provided (Tharp & Gallimore, 1988). A course that relies on CMC for either curriculum or pedagogy or both requires tools that are versatile in order to accommodate the diversity of students' backgrounds, experience levels, and digital proclivity. Most CMC tools and services offer optional features and plugins that allow students to individualize the content they create for class assignments and activities.

A fifth feature, *handover/takeover* refers to the capacity in instructors to encourage learners to assume increasing levels of responsibility and agency as they acquire additional skills and confidence over time (van Lier, 2007). This requires attention to the students' individual learning styles as well as to their overall development and to continuously assess their own roles in relation to their students' dynamic capabilities. The eventual goal is for students to assume full responsibility for the task and, by implication, their learning, with instructors moving on to a supervisory role in which they monitor students' learning and plan further, developmentally appropriate tasks. Handover/takeover is especially pertinent in CMC classrooms in that students have the option of skipping some or all the steps in tutorials for tasks they are required to perform depending on their skills levels and familiarity with the procedure. Games and simulations that adjust their interface based on the user's ability and progress are yet another example of handover/takeover.

Finally, *flow* (Csíkszentmihályi, 1990), is the sixth feature of pedagogical scaffolding discussed by van Lier (2007). Flow is a state of engagement where learners are absorbed in a task and an ideal balance exists between the challenges they experience and their ability to succeed. Additionally, learners who experience flow usually lack feelings of self-consciousness, receive direct and immediate feedback, possess feelings of personal control or agency in their learning process, and find their learning activities and experiences to be intrinsically rewarding. Assignments that build in time for students to engage in exploration of websites and CMC tools can support students in developing feelings of agency and control.

Six Scaffolding Types for CMC

Walqui (2006) describes six types of instructional scaffolding for language development for academic purposes: modeling, bridging, contextualization, schema building, text re-presentation, and metacognitive development. Second language teachers guide students to develop listening, speaking, reading, and

writing skills for academic purposes that differ in vocabulary, organization, and tone from vernacular varieties. Similar attention to the content and form of CMC is necessary in order for students to succeed academically and, increasingly, in a world immersed in and driven by technological advances. Just as utterances that students adroitly use in a playground fail to achieve the desired communicative outcome inside a classroom, so does utilizing "the language of abbreviations" (Hanson, 2007) in texting fail to convey the desired meaning in a Wiki comment. Being explicit in pointing out the differences between norms and conventions associated with CMC in academic and non-academic settings is important. However, it is also important to scaffold the use and creation of CMC content for academic purposes. An important function of scaffolding is that, though attention is on students' learning and development, scaffolds are structures that support interactions between learners and teachers or more capable peers. What follows is an elaboration on Walqui's (2006) six scaffolding types with attention to CMC. The order in which the scaffolding types is presented in this paper is different from Walqui's and reflects their relative relevance in CMC contexts.

Text Representation

Core features of academic "genres or text types and generic structures particular to specific subjects" (Gibbons, 2009, p. 6) are not always apparent to students. As a scaffold, text representation (Walqui, 2006) pertains to what is perhaps the most relevant construct in developing new literacies (Leu, et al., 2009) in CMC contexts: genres. Structuralists view language as a meaning-making process that starts with forms (i.e., utterances, phonemes, words) (Beedham, 2005, p. 6) and explains humans' natural attention to understanding what they hear, see, and read as predictable patterns. Yet, listeners and readers often fail to detect subtle differences between conventional ways of speaking and writing. Modular views of mind (Chomsky, Belletti, & Rizzi, 2002; Fodor, 1983) help us explain this process, suggesting that the intricacies of decoding and meaning-making take place within specific sections in humans' minds and without conscious monitoring. Modularity allows humans to focus their attention on meaning.

Conventional trends in language use result in predictable discourse patterns, or genres. But before considering genres as ways to categorize language, it is important to recognize that no clear agreement exists about what a genre is, even if different discourse communities or groups seem to share general ideas about particular genres (e.g., hip-hop music, horror movies, graphic novels, sitcoms). In an excellent synthesis of the history and evolution of genre theory, Daniel Chandler (1997) identifies three approaches scholars and critics have used to deal with the question of what defines the construct of genre and how to categorize collections of works by genre. One approach is to offer a definition; another to look for "family resemblances;" and a third to look for prototypical examples within each genre (pp. 2-3). Regardless of how one thinks about genres and whether or not a particular piece of work is representative or belongs in any one of them, because of their social dimension, genres have direct links with culture. In a sense, genres are the public complement of shared aspects of schemas. Humans rely on an assortment of schemas that have experiential origins and that, depending on shared experiences and interactions with other members of their community, have varying facets in common. It is in these commonalities that genres are born and become codified as people talk and write about them.

Gibbons (2002) equates learning a second language with learning the spoken and written genres of the second language culture. Citing the work of Australian linguists, Gibbons chooses the term "text types" when referring to "written texts associated with learning in school […] in order to differentiate from the wider range of genres used outside of school" (pp. 54-55). This distinction is one worth considering when thinking about CMC scaffolding. The authors' claim is that there are no "text types" in CMC yet, precisely because of their recent inclusion in education. Perhaps e-mail is the one emerging text type, though messages seem to fulfill a communicative role and are not typically explicit components of assignments. As CMC becomes increasingly incorporated into academic contexts, these tools may undergo specific adaptations for academic activities and assignments, which will lead to the emergence of CMC text types. Interestingly, the adoption of new electronic interaction tools appears to be defining new genres exclusively associated with each tool. Consider for instance the almost cryptic text messages seen across the cell phones of today's teens or the abundance of graphics and links in blog postings, the 120 character limited Tweets, or even the ubiquitous "Hi" e-mail greeting.

Walqui (2006) proposes that teachers ask students to take the content or information presented to them in one particular genre (e.g., narrative) and re-present it in a different genre (e.g., expository text). Furthermore, Walqui, citing work by Moffet (1983), argues in favor of adopting a developmental sequence in these representations. Thus, students move from discussing or acting out the content, to narrating it, to

summarizing and discussing it, to analyzing and theorizing about it. They re-present their understanding at each stage of increasing decontextualization by utilizing appropriate genres, such as a play script, a story, an expository text, and a critique or analysis essay. The goal in this scaffold is to help students distinguish between content and form and help them identify key characteristics of particular genres or text types.

In CMC classrooms, text representation can help students identify differences between genres or text types they are familiar with, such as essays or research papers, and less common forms including blog entries, Tweets, or podcasts. Text representation helps students learn how to translate the meanings they are intending to convey to match the specific constraints and potential available with each CMC tool. Text representation can also provide students with valuable practice in learning how to translate the familiar use of vernacular English they commonly use with the more formal academic discourse they will be required to use for college assignments. An example might be having students analyze the types of language they would use to update their status in Facebook versus contributing their ideas to an online class discussion.

At this point it is important to point out that text representation is a scaffold that contributes to students' development of comprehension and production skills. However, it is not only possible but likely for students to be familiar with text types or genres they read, while simultaneously being unable to write or create a product that meets the accepted conventions. Nowhere is this more evident in a CMC classroom than when students are required to create a website or Wiki page. Most students visit countless websites and pages; yet, when asked to create one, students commonly produce text-heavy pages that reflect the organization of essays or research papers. In short, they apply the schema they have for written assignments, instead of following the conventions associated with digital environments. This became clear to one of the authors when several students included a "conclusion" section on Web pages reporting on an inquiry project, even though the template provided to them did not have one.

Metacognitive Development

Walqui (2006) defines metacognition as the conscious choice of strategies when completing an activity, the ability to choose effective strategies for a specific activity, and the capacity to plan future strategy choices based on results (pp. 17-18). Anderson (2002) also sees the benefit of including metacognitive development in language development and suggests teaching the following questions to students as a way to foster metacognition:

1. What am I trying to accomplish?
2. What strategies am I using?
3. How well am I using the strategies? And,
4. What else could I do? (p. 2)

Both approaches to develop metacognitive awareness in students involve effective uses of strategies for specific tasks through reflection, self-assessment, and awareness. Metacognitive development is also an appropriate pedagogical consideration for instructors using CMC. The capacity of electronic tools to be customized to meet individual student's needs and abilities can provide powerful teaching and learning opportunities because of their inherent flexibility. But it is also this very flexibility that can be daunting to students who are new to CMC and possess limited skills and strategies for navigating and especially for creating electronic content.

Students develop metacognitive awareness through regular opportunities for self-assessment and by choosing among clear task options. Questions, prompts, and rubrics for reflection and self-assessment as well as opportunities for students to share with each other ways in which they deal with the challenges the tasks present to them are but a few ways to accomplish this. Instructors can also model metacognitive awareness for students through think-aloud procedures (Israel and Massey, 1992) in response to challenges students face. Another particularly effective way to develop metacognitive awareness is by noticing and showcasing innovative strategies that students use to the whole class. It should be noted that developing metacognitive awareness assumes a caring and supportive classroom culture that encourages students to discuss their thinking, including errors and frustrations. It also assumes the explicit and purposeful teaching of skills and strategies, in accordance with cognitive apprenticeship principles (Collins, Brown, & Newman, 1989).

In classrooms using CMC, instructors can support metacognitive awareness among students by having them examine each other's work and consulting with one another about specific aspects of the content

included. For example, students can work together to locate images that are particularly effective in conveying a desired meaning or perspective. They can also take turns responding to questions that require them to think about how and why they made certain decisions related to the content and aesthetic formatting of their blogs, Wikis, or Web pages.

Schema building

The process of constructing knowledge begins with individuals filtering new information and novel experiences through the cognitive filters of their pre-existing mental structures of meaning (Piaget, 1975). As students construct knowledge, they also develop cognitive schemas—mental models that organize their knowledge and understanding of the world—and these schemas are influential in shaping how they interpret the daily sensory and linguistic input. Schema development has long interested literacy scholars who view schemas as playing an essential role in drawing inferences from what one reads, focusing readers' attention on specific conventions or passages within texts, and aiding recall (Anderson & Pearson, 1984). Additionally, students develop schemas that guide them in recognizing different genres (e.g., comic books, recipes, textbooks) including the multimedia formats representative of most Internet content. For example, viewers' schemas for "website" help them navigate Web pages by prompting them to look for underlined text representing Weblinks, specific icons they can click on to activate videos or audio clips.

Schema building as a type of scaffolding requires instructors to help students activate patterns on digital content they detect, which increases their confidence as capable learners and to strengthen their understanding and comprehension for the new information being introduced (Walqui, 2006). Some ways to do this include explicitly linking new content to students' prior knowledge, providing overviews of new information before introducing the details, and focusing students' attention on specific aspects of the academic content through the use of advance graphic organizers. Instructors must also help students build CMC-specific schema as digital products differ considerably from traditional literacy genres. Fortunately, Web-based tools exist that can provide templates for student-generated content on the Internet and therefore act as schema building scaffolds. Examples include templates for Web pages with pre-set spaces for title banners and images as on MERLOT's Content Builder (http://www.merlot.org), Wiki-based note-taking Luminotes (https://luminotes.com), or multiple-column displays of Twitter (https://twitter.com) content organized by tag or user searches, accounts, or groups as on TweetDeck (http://tweetdeck.com/beta/).

Modeling is an instructional scaffold whereby instructors provide clear examples for students of the learning processes, finished products, and the specific uses of language that they are expected to incorporate into their assignments (Walqui, 2006). This is perhaps the scaffolding type that comes most naturally to humans and indeed constituted much of the behavior Bruner and Sherwood (1975) observed and that led to the coining of "scaffolding." Moreover, instructors continually model for students what the various steps are for the tasks and activities they are expected to complete. In addition, instructors should provide many examples of completed assignments or other relevant finished products and guide students in focused and purposeful analyses and discussions in small and large groups. By providing this level of transparency, students are better equipped to understand what is expected of them and they are better able to monitor their progress on a developing assignment. The documentation and duplication capacity of most electronic and online tools are especially useful in modeling. However, instructors must be careful to point out to students the specific features or aspects of the models for them to consider, regardless of how obvious these links may seem.

Contextualization is scaffolding that aims to link up the task and associated learning to a rich context that furthers each student's ability to comprehend the meaning coded in language as well as allowing them to tap into multi-sensory experiences that support their individual learning styles (Gardner, 2006). Walqui (2006), building on the research by Cummins and Swain (1986) and others, notes that uses of language for academic purposes tend to be decontexutalized, with little reference to the rich details that help us make sense of abstract concepts. In contrast, in their every-day use of language, humans rely on context to convey specific meanings.

Contextualization as a scaffold in CMC is enhanced by the images, sound, videos, and links to other pages that contribute to the understandings and experiences of viewers. This scaffold supports students' understanding of content by building-in redundancy. Conversely, contextualization provides students with

rich experiences and multiple sources from which to create representations through multiple media. It is important to note, however, that although students are familiar with and often look for images and other media as well as links on the Internet, the contextualizing potential of multimedia is not immediately apparent to students when they begin composing CMC content. Explicit modeling of desired products is one way to teach students to include contextualizing media in their work (see below).

Finally, *Bridging* consists of establishing explicit and clear links between what is taught and each student's pertinent experiences, their interests, and their prior learning of related content (Walqui, 2006). Bridging is scaffolding that pertains especially to comprehension and the creation of rich, complex, and individualized understandings. Therefore, surveying students during the first class meeting to assess their prior experience with blogging and other Web-related skills is essential. Recognizing student's prior exposure and facility with CMC can shape instructors' individualized feedback to students regarding the progress they make in constructing blog entries, adding content to class Wikis, or integrating YouTube videos or animations into class presentations. Bridging is at the core of student-centered approaches to teaching that are often deemed to be "constructivist."

Examples of Scaffolding and CMC in Practice

What follows is an example of scaffolding in an English Language Development Methods course for preservice teachers taught by one of the authors in which CMC was used for curricular and pedagogical purposes. This example revolves around an inquiry project on language and language development documented on a KEEP toolkit Web page template. The KEEP toolkit was originally created by the Knowledge Media Lab at the Carnegie Foundation for the Advancement of Teaching and is now hosted and supported by the Multimedia Educational Resource for Learning and Online Teaching (MERLOT). One of the features of the KEEP Toolkit is the capacity to share copies of templates or other Web pages among subscribed users.

The assignment required students to complete a semester long, three-part inquiry project on language, language learners, and their own language-development teaching practice. They were also required to document and report their research findings utilizing KEEP toolkit templates. "The Language" page (Figure 1) is one of four Web pages that make up a template site the instructor provided to each student. Though students were allowed to add on and elaborate as well as customize the content of their Web pages, particularly the "Home" page, they were required to respond to each prompt fully without exceeding the respective word count maximum. The reader will note that the example provided overlaps more than one scaffolding type. This is not at all uncommon and underscores the generative potential in Walqui's (2006) work, suggesting pedagogical possibilities depending on perspectives and emphases.

Text representation for Web page creation

The instructor introduced the inquiry project by assigning a research paper about language use and development for academic purposes. In an effort to be explicit about text types and to build upon existing schemas, students were told to follow widespread conventions for research papers: title, introduction with thesis statement, supporting arguments, conclusion, and references. After obtaining feedback on their papers, students transferred the information from their papers onto the template's "The Language" page. This second phase of the assignment also required them to add at least four images and links to other Web pages that were relevant and appropriate. Asking students to represent the information in their research papers makes it possible for students to focus their attention on the form and appearance of Web pages as a genre without worrying about the content. Furthermore, the contrast between the two products (i.e., traditional academic paper and Web page) as well as the process required to create each were rich sources of reflection and discussion about language, language use, and the pedagogy required to maximize digital literacy development opportunities, which develops metacognitive (and metalinguistic) awareness. The assignment also offered opportunities to discuss copyright considerations and demonstrate image searches and share image search and display tools such as Seadragon (http://livelabs.com/seadragon/), Photosynth (http://livelabs.com/photosynth/), and Multicolr (http://labs.ideeinc.com/multicolr).

Evaluating, sorting, and outlining for metacognitive awareness and schema building

Metacognitive awareness can be achieved by teaching students to sort through and critically evaluate the immense amount of information available in digital environments. Students need to learn critical digital

literacy skills to recognize scholarly information that is appropriate for inclusion in their academic assignments and projects from persuasive messages, infomercials, and un-vetted information so prevalent on the Internet. Quintana and Zhang's (2004) IdeaKeeper Notepad is a useful scaffolding tool for online inquiry. Similarly, the *CML MediaLit Kit* (2009) recommends that instructors and students learn to ask the following questions of all Internet content:

- Who created this message?
- What creative techniques are used to attract my attention?
- How might different people understand this message differently?
- What values, lifestyles, and points of view are represented in, or omitted from, this message?
- Why is this message being sent?

For educators well versed in social justice and equity work, these questions are woven into the very fabric of their coursework. Even so, it is essential to remain attentive to teach students to be as judicious in using critical thinking and metacognitive skills with digitally mediated information as is customary for all academic work.

The KEEP Toolkit and the other online tools mentioned above (e.g., Luminotes, Twitter, TweetDeck) as well as brainstorming and outlining programs such as MindManager (http://www.mindjet.com/us/), MindMap (http://www.conceptdraw.com/), and OmniOutliner (http://www.omnigroup.com/) help students organize content onto manageable, related chunks. Figure 1 shows the template for "The Language" Web page assignment described above. By providing students specific prompts for each of the sections on the Web page, they construct individual schemas for the various categories associated with research in general (e.g., background, findings, discussion) as well as for the specific information each student wrote about. Furthermore, the images, links, and possible multi-media the students incorporate into their respective Web pages are likely to generate complex, memorable schemas that enhance long-term learning.

An analysis of the "Language" Web pages produced by preservice teachers in the course revealed that 60 percent (12 out of 20) modified the headings or distribution of the boxes in the template, while addressing all the required points. They did this while observing the word limits for each section, including images and relevant links, and personalizing their pages through font and background color changes. Although not required, 55 percent included either audio or video files on one or more of the four template Web pages, and two students created additional linked pages to meet their design goals. Considering that only three students had "basic" skills on Web design and publishing, it is safe to conclude that the pedagogical scaffolds contributed to the students' success and new literacy skills (Leu et al., 2009). One student, who had no previous Web publishing experience, embraced the medium and taught herself to embed YouTube clips on her template pages. With other instructors' consent, this student used the KEEP Toolkit for assignments in other courses to share her own students' learning to their families. In contrast, another student's Web pages exceeded the word limits and, though she made an effort to upload images to complement her writing, the images were in a format incompatible for Web browsers.

Conclusion

The moral component of the work of teacher educators compels them to reflect on what is changing in the 21st century's landscape of literacies and to adapt courses to reflect the new skills, knowledge and dispositions that students will need to have for future employment and full participation in society. Students can no longer learn to read and write basic texts and be considered literate. Instead, their skills must incorporate traditional competencies and expand to include abilities in interpreting diverse forms of text, images and graphics in computer-mediated environments. Preparing teachers to support students' learning and development in modern education demands an intentional dedication to increase their comfort and use of technology for academic purposes.

Just as the Internet has vastly increased the amount of information and content available to humans, CMC is creating a wide range of new pedagogical methods that support a more diverse and participatory context for students' learning and education. Although many students entering today's classrooms are "digital natives" (Palfrey & Gasser, 2008)—savvy in the various forms of constructing meaning in digitally mediated contexts—a wide spectrum of students have little understanding of digital literacies or may lack the motivation or interest to expand their knowledge of CMC. Even digital natives have often used CMC exclusively for social purposes and therefore, may lack experience in how to translate the use of these

tools for academic coursework. For these reasons, it is essential to not only greatly expand CMC in higher education but also carefully plan for the supports students will need in learning to navigate, understand, critique, and compose with the new literacies (Leu et al., 2009) emerging in an increasingly digital world.

The Language   11/14/09 11:54 PM

Descriptive Title (consider using your research question)

In this section, provide the visitor with an abstract of your research findings about some aspect of language or language development that is relevant to schools and teaching.

You may want to begin with a quotation or other similar "hook" or "attention-getter" device to interest the viewer to continue reading. Another possibility is to use a pertinent video clip and/or an image. Also, use the "edit links" feature to upload a pdf copy of your research paper. Make sure to include a teaser blurb with the link. **(100 words max.)**

Background and Context

Provide the visitor with the necessary context to understand the topic you researched. Summarize your rationale or motivation for choosing your research question. Information that you ought to consider including might be your own experiences in learning language(s), academic background, observations you've made regarding language and teaching and learning, and students' use of language vis a vis your teaching and their academic achievement. Connect your summary to your placement in terms of what seems relevant and, if appropriate and useful, consider using some of the information requested by the "Context of Learning" task in your Teaching Event. **(200 words max.)**

Findings

State your thesis and a summary of the supporting arguments or major research findings from your paper. (Don't just cut-and-paste!) List your findings in order of importance and provide only essential details. If you think it is essential or important to provide the visitor with more information than just a summary, I suggest that you create another snapshot and link it to this page. Finally, I strongly suggest that you include pictures, quotes, and other appropriate media to illustrate your findings as well as links to other pertinent pages or sites. **(150 words max.)**

Discussion and Implications

What do your findings mean to you and other teachers? Specifically, what do your findings say about your job as a teacher interested in furthering your students' proficiency in using language for academic purposes? What further questions and/or ideas for future research emerge? And are there limitations in your findings that the visitor ought to consider? As with all other boxes on this page, consider using more than just written text to maximize your communicative power. **(200 words max.)**

Sources of Information

List publications and other sources of information you consulted while completing this research project. List them in order of relevance. If available, provide links to sites and/or published references.

This electronic portfolio was created using the MERLOT Content Builder, an adaptation of the KEEP (Knowledge Exchange Exhibition Presentation) Toolkit originally developed by the Knowledge Media Lab of The Carnegie Foundation for the Advancement of Teaching.

http://contentbuilder.merlot.org/toolkit/html/snapshot.php?id=10266388030971   Page 1 of 1

Figure 1. Template for "The Language" KEEP Toolkit Web page

Walqui's (2006) discussion of scaffolding for language development can help educators think about the pedagogical territory involved in providing these critical supports. As the new technology-based literacies are inherently social—descriptors range from "networked", "collaborative" and "shifting notions of privacy

and ownership" (University of Michigan, 2008, p. 4)—instructing students in their use will require theoretical models and practical techniques that are epistemologically aligned with the community orientation at the heart of all CMC tools. Walqui's typology is based on social constructivist theory and recognizes the sociocultural milieu at the foundation of all language and literacy learning (Freedman & Ball, 2004; Gee, 2000; Vygotsky, 1978). She highlights the central place of shared social practices in students' learning processes and the essential need for instructors to scaffold classroom social interactions so that they lead to linguistic and academic learning within students' zones of proximal development. An analysis of Walqui's six scaffolding types suggests their clear agreement with social constructivist foundations with schema building the only scaffold type she describes that does not require the direct presence of peers or instructors. It is also possible for students to access their own resources and thus move on their own into their zones of proximal development without a peer or teacher (van Lier ,2007), especially when interacting with digital environments.

Walqui's (2006) descriptions of the scaffolding structures (rituals, routines, community) and scaffolding processes (activities and supported interactions) necessary to support English language learners are very instructive for educators interested in understanding the complex work of socializing students to gain fluency an ever-expanding technologically-embedded world. Through carefully planned coursework that integrates the various features and types of scaffolding described throughout this paper, teacher educators can play an important role in strengthening students' digital literacy skills and reducing the participation gap that threatens to create a cultural divide between educators and their increasingly "wired" students. The time has come for teacher educators to step beyond the comfort and familiarity of the brick-and-mortar university to embrace the diverse digital infrastructure that is the students' learning landscape. From blogs to animations to computer games and interactive websites, teacher educators' work in preparing tomorrow's teachers trends increasingly towards a digitally mediated campus. As Twitter prompts, "What are *you* doing?"

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