8 An electronic literacy approach to network-based language teaching

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Introduction

Since the early 1990s, English-language teaching professionals have tried a variety of ways to make use of the Internet to promote language learning and practice. These range from the creation of self-access on-line quiz collections to the use of authentic on-line materials as input for content-based projects and activities (Hegelheimer, Mills, Salzmann, & Shetzer, 1996).[1]

However, the Internet is much more than just a teaching tool. It is becoming one of the primary media of literacy and communication practices. The estimated number of worldwide users of the Internet topped 130 million in August 1998 (Nua Ltd., 1998) and continues to grow at a rate of 40%–50% a year, with growth rates in China, Indonesia, and other developing countries as great as or greater than in the United States (Glave, 1998). E-mail is now surpassing face-to-face and telephone conversation as the most frequently used communication tool in certain business sectors (American Management Association International, 1998), while Internet-based publishing and collaboration are transforming scientific research (Harnad, 1991). Meanwhile, students of all ages must learn to find, share, and interpret on-line information as part of a necessary shift from *just in case* to *just in time* learning (Lemke, 1998). Even in the personal sphere, the Internet has become a major arena for entertainment and socializing in the United States and other developed countries. Thus, it is no exaggeration to say that the development of literacy and communication skills in new on-line media is critical to success in almost all walks of life. Finally, with an estimated 85% of the electronically stored information in the world in the English language (Crystal, 1997), the overlap between English language learning and the development of electronic literacy is especially pronounced.

1 For examples of self-access on-line quiz collections, see Dave's ESL Café (http://www.eslcafe.com) or InternetTESL Self-Study Quizzes (http://www.aitech.ac.jp/~iteslj/quizzes/). For content-based projects and activities, see, in addition to Hegelheimer et al., OPPortunities in ESL Theme-Based Pages (http://darkwing.uoregon.edu/~leslieob/themes.html).

Therefore, whereas previously educators considered how to use information technology in order to teach language, it is now essential also to consider how to teach language so that learners can make effective use of information technology. Working toward both these objectives, rather than just the first one, is what distinguishes an electronic literacy approach to network-based language teaching.

In developing and implementing an electronic literacy approach, a number of questions must be addressed. How should ESL and EFL teachers make best use of new on-line opportunities to maximize language study and practice while also helping students develop computer-based communication and literacy skills? What strategies for communicating and networking should students be taught? What goals should language teachers aim for and what kinds of on-line projects could students carry out to accomplish those goals? Which are the most crucial electronic resources and tools that teachers should learn so that they can teach them to their students? How can teachers encourage students to become autonomous learners who can continue to learn how to communicate, conduct research, and present their ideas effectively using information technology beyond the confines of the class or the semester?

To address these questions, we begin by presenting a conceptual framework for the development of electronic literacy. We then discuss classroom applications derived from this framework. Finally, we examine the research implications of an electronic literacy approach.

An electronic literacy framework

An electronic literacy framework is based on several premises. First, it assumes that becoming literate is not just a matter of learning how to decode and put to paper letters and words, but rather a matter of mastering processes that are deemed valuable in particular societies, cultures, and contexts. Thus, just as the development of the printing press helped to redefine literacy in Europe and, eventually, the whole world (Eisenstein, 1979), the spread of on-line communication is reshaping literacy today, and this time at a much faster pace (Warschauer, 1999). Within the industrialized world, virtually all academic and professional writing now involves computer use, and, according to some predictions, most reading will likely take place on computer screens within a few decades (Bolter, 1991). Literacy is a shifting target, and we have to prepare students for their future rather than our past.

An electronic literacy approach also assumes that there is not just one literacy, but many kinds of literacy, depending on context, purpose, and medium. Although reading and writing on-line are closely related to reading and writing in print, the two literacy contexts are also sufficiently different to demand theoretical and practical attention.

Finally, an electronic literacy framework differs sharply from the notion of *computer literacy,* a concept now largely discredited for its minimalist focus on matters such as how to turn a computer on and operate simple programs (Papert, 1980). Rather, an electronic literacy framework considers how people use computers to interpret and express meaning. Electronic literacy thus involves what has been called information literacy – the ability to find, organize, and make use of information – but electronic literacy is broader in that it also encompasses how to read and write in a new medium.

We divide electronic literacy skills into three broad, overlapping areas: communication, construction, and research (cf. Eisenberg & Johnson, 1996; Eisenberg & Berkowitz, 1998; Lemke, 1998). In the rest of this section, we will examine these three areas conceptually, and then discuss practical applications in the following section.

Communication

By allowing us to communicate with groups of people all over the world, simultaneously, at little cost, and in an archived format that allows us to record, reflect on, and refine our previous words as well as those of our interlocutors, computer-mediated communication serves as an intellectual amplifier, bringing about a revolution in human interaction and cognition (Harasim, 1990; Harnad, 1991). It is no surprise that such a powerful communications tool is transforming how we interact in business, education, and personal life.

Yet, like many powerful tools, computer-mediated communication is difficult to master and, if used poorly, can do as much harm as good. Several features of computer-mediated communication deserve attention.

Computer-mediated communication (CMC) has been found to exhibit certain characteristics typical of written communication, certain characteristics typical of spoken communication, and other characteristics unique to the computer medium (Collor & Bellmore, 1996; Werry, 1996; Yates, 1996). For example, CMC includes its own forms of salutation and greetings and, in some forms, its own special uses of abbreviations and symbols (Werry, 1996). On-line forums develop their own complex rules for turn taking and topic shifting, which differ greatly from those of other oral or written media. Just as in all communication, those who master the particular stylistic and sociolinguistic features required by the context and medium will best reach their audience.

Computer-mediated communication strips away factors that tend to control or delimit face-to-face conversation. CMC reduces social context clues related to race, gender, handicap, accent, and status, as well as nonverbal cues, such as frowning and hesitating (Sproull & Kiesler, 1991). CMC also allows individuals to contribute at their own time and pace, neutralizing the advantage of those who tend to speak out loudest and

interrupt the most (ibid.). The result is free-flowing communication that, if handled well, can result in the fruitful exchange of ideas but, if handled poorly, can quickly erupt into hostile outbursts. In the "Classroom applications" section of this chapter, we offer suggestions for structuring effective electronic literacy activities.

The result is that learning how to communicate effectively via computer involves more than just translating from one communications medium to another; it involves new ways of interacting and collaborating. To use an urban metaphor, the Internet is analogous to the typical postmodern city, such as Los Angeles; it is "pluralistic, chaotic, designed in detail yet lacking universal foundations or principles, continually changing, linked by centreless flows of information" (Relph, 1991, pp. 104–105). And the newcomer to the Internet, as to Los Angeles, must learn to negotiate the decentered terrain.

Construction

Construction more or less corresponds to what would be considered "writing" in traditional pedagogy. However, the term "construction" is used to designate three important shifts: (1) from essay to hypertext, (2) from words to multimedia, and (3) from author to co-constructor.

Although essays are never read in a linear fashion, they at least appear in a linear form. The hypertext that appears on the World Wide Web, with its decentralized linkages to other materials at the same Web site or to other Web sites around the world, represents a radically different way of presenting information. Hypertext is far from replacing traditional linear genres of writing, but at the very least is supplementing them as an important new way of way of presenting written information and ideas (Bolter, 1991; Lanham, 1993). Creating a good hypertext involves many challenges, from the rhetorical to the organizational to the technical.

Hypertext authoring is not only a matter of reconceptualizing how to arrange words; it also involves creative use of other media, such as graphics, audio, and video. Document appearance has been an important feature since long before the Internet. However, with each decade of the electronic era, the value of the visual is growing, as witnessed by changes in everything from newspaper styles to television news to school textbooks (Kress, 1998). The Internet represents a further extension of this, with quality Web documents judged as much for their appearance and presentation as for their texts. It is not a matter of starting with a text and then prettifying it, but rather of knowing how to combine various media to communicate most effectively to an audience (Kress, 1998; Lemke, 1998).

Finally, on-line construction of documents is generally a collaborative process, in several ways. First, most Web sites are the joint effort of a

team of people rather than just one person. Second, Web sites inevitably link to the work of other sites and authors; whereas this is also done via footnoting in traditional texts, it becomes a much more dynamic form of interaction in Web site design, as the original author(s) must consider that the reader will link to the other site in the middle of reading and thus engage in the two (or more) pieces in a back and forth fashion. In this sense, then, the readers also become co-constructors, as they play a more active role in piecing together texts to make meaning (Landow, 1992). Finally, the hypertext author must consider the possible interaction and response not only of the intended audience, but also of a much broader audience that might happen across the Web site.

Research

The amount of information available worldwide to the average individual has exploded in recent years, and an increasing amount of it is available on-line. Knowing how to navigate Internet sources, search for information, and critically evaluate and interpret what is found represents perhaps the most crucial set of electronic literacy skills.

To understand how research, and other related skills such as reading, have changed in the on-line environment, let us examine the example of a student who is assigned to do a research project on a contemporary topic. In a traditional print environment, the student will go to the library, gather some source material, bring it home, read through it, and write up an essay to turn in to the teacher. The student would assume that the sources were valid because they were (a) published in a book, and (b) included in the library's holdings. If any questions came up about the sources, the student could clear these up with the teacher later.

Students looking for information on the Internet would have to use very different reading and research strategies. On the Internet, reading skills are intimately bound up with searching and evaluation skills, just to find the material that one wants. This involves first knowing how to use search engines effectively and then being able to skim and scan to see if what was found is remotely of interest, while simultaneously making judgments as to its source, validity, reliability, and accuracy – and then making on-the-spot judgments about whether to continue perusing that Web page, go to other links from the same page, go back to the search engine, or give up the Internet altogether for this particular investigation and try another source. Thus, reading in the on-line realm by necessity becomes critical literacy – because those who cannot make critical evaluations cannot even find what they need to read on the Internet.

Finally, as suggested earlier, on-line reading and research also involve the ability to critically evaluate not only texts, but also multimedia documents. One important advantage of having students construct multimedia

work is that they will then be in a better position to critically interpret multimedia documents produced by others.

One other principle of electronic literacy intersects with all of the others, and that is learner autonomy. Lemke (1998) distinguishes between a *curricular learning paradigm,* which dominates much of education today, and an *interactive learning paradigm* of libraries and research centers. In the former, someone else decides what you need to know and when you need to know it; in the latter, determining your own learning goals and interests is the key feature of the educational process. Flexible, autonomous, lifelong learning is essential to success in the age of information (Reich, 1991; Rifkin, 1995). Autonomous learners know how to formulate research questions and devise plans to answer them. They answer their own questions through accessing learning tools and resources online and off-line. Moreover, autonomous learners are able to take charge of their own learning by working on individual and collaborative projects that result in communication opportunities in the form of presentations, Web sites, and traditional publications accessible to local and global audiences. Language professionals who have access to an Internet computer classroom are in a position to teach students valuable lifelong learning skills and strategies for becoming autonomous learners.

Table 1 summarizes some of the key differences between an electronic literacy approach and earlier approaches to language and literacy instruction.

Classroom applications

The framework described in this section is designed to be used as a tool for planning tasks and projects for the language classroom that use computers and the Internet as tools for personal and professional empowerment. The framework expands on the three areas already discussed: communication, construction, and research. Within each section of the framework, skills and activities are suggested to promote autonomous learning and meaningful language use.

Access to technological tools and resources varies from context to context, and technologies change rapidly. Therefore, the following list allows instructors the flexibility to select and choose from the technologies available in their particular teaching context.

Electronic literacy and language use

Communication
- How to contact *individuals* to ask a question, give an opinion, give advice, or share knowledge. How to respond to questions, replies, feedback, advice, or other communication.

TABLE 1. EARLIER APPROACHES VERSUS ELECTRONIC LITERACY APPROACH

	Earlier approaches	*Electronic literacy approach*
Communication	Based on speaking and listening	Also includes computer-mediated communication
Construction	Based on linear texts	Also includes hypertexts
	Excludes nonprint media	Combines texts and other media
	Tends to focus on individual writing	Strong focus on collaboration
Reading & research	Restricted to print sources	Includes on-line sources
	Focuses on linear texts	Also includes hypertexts
	Excludes nonprint media	Combines texts and other media
	Tends to separate reading skills from critical evaluation skills	Views critical evaluation as central to reading
	Focuses on library search skills	Includes searching and navigating on-line sources
Learning paradigm	Often based on curricular learning paradigm	Based on interactive learning paradigm, with emphasis on autonomous learning

- How to contact *groups* of people using a variety of on-line technologies in order to read for comprehension, ask a question, share an opinion, give advice, share knowledge, conduct surveys, and post summaries and original research. How to be contacted and interact with groups of people.
- How to participate in *collaborative projects* with people in different places to accomplish a shared goal (i.e., how to set up and participate in communication networks).
- How to select the available *asynchronous technologies* such as e-mail, e-mail lists, Web bulletin boards, and news groups.
- How to select the *synchronous technologies* such as MOOs, chat rooms, IRC, person-to-person and group videoconferencing via CU-See Me, Internet Phones, or other tools.
- Understanding *implications*: netiquette issues, privacy issues, safety issues, corporate advertising issues.

Construction
- How to *create* Web pages and Web sites, individually and collaboratively, through effective combination of texts and other media in hypertext format.

- How to *store, maintain, and manage* Web sites so they can be viewed locally and globally.
- How to *market* Web sites and encourage communication about topics presented in Web sites.
- How to select the available *Web technologies:* Hypertext Markup Language (HTML), Web page creation software programs, Web page storage options.
- Understanding *implications:* Copyright issues, intellectual property issues, corporate advertising issues, safety issues, and censorship issues.

Research

- How to come up with *questions* to investigate, how to develop keywords, how to categorize and subcategorize, how to map ideas and concepts (nonlinear idea development).
- How to *find information* on-line using Web indices, search engines, and other specialized search tools.
- How to *evaluate and analyze* the value of information and tools.
- How to determine *authority and expertise.*
- How to identify *rhetorical techniques* of persuasion.
- How to *distinguish* primary and secondary sources.
- How to *cite* on-line sources and give credit to others.
- How to select the available *search technologies:* search indices and engines, software packages for brainstorming, and so on.
- Understanding *implications:* corporate advertising issues, authority issues, privacy issues, quality issues, theft/crime issues.

Each section of the framework suggests potential implications with the activities that åre listed. Many of these implications challenge the boundaries of traditional teaching. Teaching students to ask questions and find answers in a global, on-line context raises provocative sociopolitical issues that teachers need to comprehend in order to effectively teach strategies for autonomous learning and language use. Instructors are encouraged to draw from the suggestions presented here to develop new, integrative activities that combine all three parts of the framework.

Communication

Many of the ideas presented in the communication section of the framework encourage the teaching of speech acts and conversational strategies and functions reminiscent of notional-functional syllabi. In this case, though, they are taught not as part of an abstract syllabus but in response to the real needs of students as they engage in authentic interaction. Through e-mail and other electronic communication tools, students have the opportunity to contact speakers of the language studied in the

classroom, and they also have the opportunity to encounter and study asynchronous and synchronous examples of the language in practice. The Internet opens multiple communication channels for interpersonal communication, group discussion, and information sharing.

For explicit language practice, in the networked computer laboratory, students might *study questions that other people ask and the responses given to the questions* in public places on the Internet. This can be done by studying the language of e-mail discussion groups, news groups, and Web bulletin boards, for example. The teacher could bring in examples of questions and answers she has collected from these media for an initial class discussion (with permission from the authors). She could start with questions and answers posted on e-mail lists, for instance. Next, students could be taught how to find and subscribe to e-mail lists for their own monitoring and communication. Each student could choose an e-mail list to join and monitor during the semester or quarter for language study activities.

Students can also *compose answers in response to the questions other people ask* in public forums as an experiential learning activity. Students can select a question and respond either publicly to the forum or privately by sending an e-mail message directly to the person who posted the message. Students can print out the question and their response and any replies that happened after they made contact. These could be used as part of communication-based journal entries.

Besides asking and answering questions, students can also *study opinions given in public forums and reactions to the opinions* made by other people participating in the discussions. To initiate the class activity, the teacher can distribute examples of people giving opinions and reactions to different ideas. The class could study these examples and develop their own hypotheses about the best way to phrase opinions to share in public spaces.

Another type of communication opportunity on-line is the ability to *share recommendations* for useful resources and tools found on and off the Internet. Students can do research on the Web, for example, and share their results on an e-mail list relevant to the topic of their research. Students can also *ask for recommendations* of Web sites and journal articles related to their topic. They can then summarize and post the results they have collected for the entire on-line forum. These activities happen repeatedly on academic e-mail lists. Students can thus be taught important networking skills with immediate relevance to their academic work.

Many instructors like their students to *survey groups of people* and report their results in class (see, for example, Ady, 1995; Kendall, 1995). Students can work in groups to develop research questions, write up surveys, contact survey participants via the Internet, and interpret survey results. They can also post and discuss their results on-line.

Integrating communication-focused activities such as these takes a good deal of preparation, organization, and time. In many cases, instructors must first learn how to use the associated Internet communication forums (e.g., e-mail discussion lists, Web discussion boards) themselves in order to understand how they can be used for structuring language practice opportunities. It might also take considerable time to collect examples of on-line communicative acts. Thus, professional development and institutional implications are involved: Teachers need to learn how to use tools, and they also need support and encouragement from their teaching institutions to design classes that contain the components desired.

If students join and participate in on-line discussion forums, they, as well as their teachers, might encounter a range of problems dealing with netiquette, privacy, and safety. These are all topics that should be included into the classroom lessons. Students can discuss together the role of proper netiquette (polite on-line behavior) as well as basic notions of on-line privacy. They need to be made aware that electronic messages sent to public forums on-line are often archived and permanently made available to the public. Teachers can integrate on-line "street smart" strategies into their lessons to promote effective, safe on-line communication practices. The goal should be that students learn to effectively network and promote their ideas on-line, without taking unnecessary risks.

Construction

Creating Web pages and Web sites is an increasingly common activity in business and academic environments. Using tools available in the learning context, such as text editors for writing HTML or Web page creation software, students can create their own Web sites to express themselves through text, graphics, audio, and video. What is unique about having students create Web pages for communication and expression is that their work may be stored on a world-accessible Web server. This provides opportunities for public on-line publishing that can result in students receiving rapid attention and feedback for their writing.

Some teachers might assist students to publish their writing in the teacher's own Web server space or publish student work in on-line magazines devoted to publishing student writing. In this case, the editing and/or maintenance of these documents is in the hands of people other than the students. An alternative is to teach students how they can publish, maintain, and control their own writing on-line. Students can be taught how to manage their own Web sites by controlling their own Web server space, which is now made available free through many venues. Essentially, this lets students become the writers, editors, and publishers of their own information and provides personal power that might bring results well beyond the language classroom. For example, some students might create

on-line résumés and portfolios of their professional work to help them apply for jobs in their countries or elsewhere. Students in the Business English Program at the University of California, Santa Barbara (UCSB), create portfolio Web sites consisting of professional biographies, résumés, and useful resource pages for projecting their professional on-line presence.

Students can also be encouraged to market their creations to the Internet community to get feedback on their work and to encourage a dialogue with others who share similar interests. Students can announce their work on e-mail lists, register their work with search engines and indices, and do research on the Web for information on how to further promote their work. Web page creation can be a supplementary component to a language class that meets occasionally in a computer lab, or it can be a course in itself, such as the "English through Web Page Creation" course offered in the English Language Program at UCSB, which involves students in a series of increasingly complex Web design projects resulting in on-line publishing of student-created sites.

The teaching challenges that arise when students create Web pages include issues of plagiarism and copyright violation. The ease with which images or text can be copied from one Web page to another raises intellectual property issues that need to be discussed in the classroom. Students need to be taught how to ask for permission to copy graphics that are not from copyright-free image archives. They also need to learn to properly cite works created by others.

Research

The Internet is a powerful tool for finding information from educational organizations, governmental organizations, businesses, and individuals. With on-line search tools such as search engines and indices, students can learn how to answer questions they devise themselves or that their teachers devise for them. Research tasks that can be done using on-line tools can be learning activities themselves or can be a part of larger projects that integrate listening, speaking, reading, and writing tasks.

In order to promote autonomous learning, teachers might progress from teacher-directed projects, which provide necessary scaffolding for beginning Internet users, to student-directed projects. Beginning steps might include having students scan preselected Web sites for answers to specific questions or to complete an on-line "scavenger hunt" (i.e., a contest involving a timed search for on-line information). Later, students can use Web search engines and indices to answer other specific questions. Later still, they might jointly conduct research on a topic agreed upon by the entire class for compilation into a document to be shared by all, such as a handout or a Web page. After doing initial training activities such as these,

students should have mastered the basics of searching for information and will likely be ready to do a research activity based on their own interests. Combinations of group discussion, teacher–student meetings, dialogue journals, and needs analysis questionnaires can be used to help students define their interests and establish research questions. Students can then write a statement of interest that explains and proposes their research, or develop learning contracts (Davidson, 1997) to structure their projects and determine final outcomes. The research itself can involve collaboration and communication with their peers or with distant interlocutors, and can result in on-line publication, thus achieving an integration of communication, construction, and research.

Research implications of an electronic literacy approach

Finally, we examine the concept of "research" in a slightly different guise than that described earlier. We now look at professional research into the learning process itself. Here we are concerned not so much with general research into network-based language learning (as discussed throughout this book), but with the specific kind of research meant to yield insight into the development of electronic literacies.

In this regard, we would contend that, just as the *development* of electronic literacies affects notions of student research, so the *investigation* of electronic literacies affects notions of professional research. In our opinion, excellent models of research on electronic literacies (1) involve teachers themselves as autonomous investigators involved in lifelong learning (rather than having research relegated exclusively to outside experts); (2) involve students as well as co-investigators into their own learning processes (because students are essential co-constructors of knowledge in a learner-centered classroom); and (3) take advantage of the new types of collaborative interaction and co-construction of knowledge facilitated by electronic communication.

An outstanding model of this type of research is provided by Heath (1992), who corresponded by distance with the teacher and students in a 9th-grade English class as they collaboratively investigated the students' uses of oral and written language in the classroom and community. Although Heath's project did not involve electronic communication (as either an object of study or a medium of interaction), it is not hard to imagine the advantages of similar action-research projects involving students, teachers, and, where appropriate, outside researchers jointly communicating via e-mail or the World Wide Web about their own electronic literacy practices. One of us has, in fact, successfully employed such triangular electronic communication in investigating electronic literacy practices (see Warschauer, Chapter 3, this volume).

We do not contend that action research is the only viable model for investigating electronic literacies, just that it is a research approach especially congruent with this topic of investigation. Teachers and students can work collaboratively to look at the types of language they use in different media, their attitudes toward communicating in a variety of media, and the problems and successes that arise as they try to implement their own goals related to technology-enhanced learning and teaching. Computer-assisted discussion sessions, on-line dialogue journals, and other forms of electronic communication provide an excellent means for engaging interactively while saving interactions for future reflection. Writing up their analyses in the form of on-line presentations can provide opportunities to further practice what they have learned, and also to get feedback and input rapidly from the broader language teaching and learning community. Such a process provides opportunities for both teachers and students to reflect critically on the issues they discovered during their research and to revise future teaching, learning, or research plans (Ross, Bondy, & Kyle, 1993; Eby & Kujawa, 1994; Richards & Lockhart, 1994; Shetzer, 1997).

To return to our earlier urban metaphor, it has been noted that the postmodern city "renders doubtful most of the conventional ways of thinking about landscapes and geographical patterns. It is also a serious challenge for cartographers" (Relph, 1991, p. 105). We would contend that the rapid growth of the Internet equally complicates the work of those of us who are trying to map out theories of language and literacy development. By engaging students, teachers, and scholars in collaborative investigative activity, we can at least begin to describe the terrain of electronic literacy and inquire into its myriad sources of diversity.

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