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Preparing Tomorrow's English Language Arts Teachers Today: Principles and Practices for Infusing Technology

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> Computing is not just a new technology or a new medium of communication; rather, it is a radical new way to process and organize information and as such it represents a new form of language.
>
> Robert K. Logan

Teachers using technology in their English language arts classrooms are not only improving their instruction for their students; they are changing the very nature of that instruction. The following are three examples of English language arts classrooms where technology serves an integral part of classroom instruction.

- High school students in New York assemble and publish a school literary magazine each year. Nothing unusual about that...except that this particular magazine contains contributions from students in 10-15 different countries! The student editors solicit contributions on the Internet, and students' writing is sent to the editors through e-mail for review and evaluation.
- A teacher in Orlando, Florida has her students read Mark Twain's novel, *The Adventures of Huckleberry Finn*, and they discuss the book chapter by chapter. Sounds like standard operating procedure...except that her students also post their responses to each chapter on a listserv where other students in a classroom in Russia can add their own thoughts. Both classrooms—in Florida and in Russia—are reading through the novel at the same time and at the same rate so the students can share thoughts and negotiate meanings among one another.
- During the 1990-91 school year, Jeff Golub, one of the authors of this article, was teaching at Shorecrest High School in Seattle, Washington. The Persian Gulf War broke out at this time, and Jeff had his students corresponding with several Israeli students through the International Education and Resources Network (http://www.iearn.org). In this way, Jeff's students received eyewitness accounts for the personal costs of the war and were able to ask questions over a period of three crucial months. Jeff's students learned that one Israeli student was afraid to take a shower because she "might miss hearing the alarm that signaled another attack." Another student wrote, "Well, I'm going

to bed now. I hope there won't be any attack. This is the worst time to get bombed."

These scenarios reveal teachers who not only know technology but also know how to use it appropriately in their teaching to the students' benefit. How do we prepare these kinds of teachers—the kinds of teachers who know their content (English language arts), know content pedagogy (how to teach English language arts), and know instructional technology (how to infuse technology appropriately into that teaching)?

Principles of Technology Infusion

As English language arts teacher educators, it is our role to prepare English language arts teachers today who will be the classroom and school leaders of tomorrow. These new teachers must be ready to step into the status quo as well as to advance the profession by infusing technology into their teaching. If we want new English language arts teachers who can accomplish this feat, we as their teacher educators must be models of that process.

We offer the following seven principles as touchstones for infusing technology into English language arts teacher preparation programs. These principles grow from and correlate with the National Council of Teachers of English *Guidelines for the Preparation of Teachers of English Language Arts* (1996) and the International Society for Technology in Education *National Educational Technology Standards for Students: Connecting Curriculum and Technology* (2000).

We and our students who will soon become teachers need to:

1. introduce and infuse technology in context;

2. focus on the importance of technology as a literacy tool;

3. model English language arts learning and teaching while infusing technology;

4. evaluate critically when and how to use technology in English language arts classroom;

5. provide a wide range of opportunities to use technology;

6. examine and determine ways of analyzing, evaluating, and grading English language arts technology projects; and

7. emphasize issues of equity and diversity.

Discussion of Principles

Principle 1: Introduce and Infuse Technology in Context

We believe that this principle is the *sine qua non* of the list. Technology should be a naturally supporting background for both the content and the *pedagogical content knowledge* (Shulman,

1987) of English language arts. Teaching and learning English language arts is our goal; technology is a means by which we can reach that goal. To infuse this technology, we must build on what we know from research and practice—that is, "what we know about reading [and literature], writing, speaking, listening, viewing and visually representing" (National Council of Teachers of English, *Standards*, p. 1). These primary elements of our discipline serve as the centerpiece of our English language arts teacher preparation.

Another context to consider when making instructional decisions is the students themselves. They will be at different levels of development as users of technology, and we must determine and honor those levels. Then, within our classes we can build the instructional scaffolds for students to advance as technology users while staying focused on teaching English language arts.

> **Example:** In a "Teaching Writing" methods class, for example, the teacher educator, aware of the literature on peer response and student writing, asks students in class to post their drafts on the computer screens. Students then move from one computer to another, first reading classmates' rough draft and then offering revision suggestions in writing. Students continue to move from one computer to another, stopping at each to read and then write responses and suggestions. When the authors return to their own computer, they find on the screen a wealth of responses to consider as they set about revising the draft. After the students/preservice teachers experience the activity, they reflect on the process, determine its rationale based on "what we know" about teaching writing, and then articulate that rationale. The discussion then turns to how technology aided this experience, how it is different from a similar paper-and-pencil activity.

To carry this experience to the next level of learning, Carol's writing methods students engage in ongoing email correspondence with students at a local middle school. The methods students help the middle school students with their writing, offering suggestions for revision and serving as a real, appreciative audience. The middle school students get substantial, individualized help with their language, and the methods students get to know middle school students while learning the instructional revision approaches and communication skills beneficial for young adolescents (http://www2.ncsu.edu/ncsu/cep/ci/eci307.html). In these scenarios there is an interlocking of content (writing), content pedagogy (peer response), and technology. Technology is not an "add-on" but an integral part of the instruction (http://courses.ncsu.edu/classes/eci307001/index.html).

Principle 2: Focus on the Importance of Technology as a Literacy Tool

In English language arts teacher preparation programs, it is critical to acknowledge the impact technology has had on our language—how we read, write, view, and visually represent information. Words used everyday such as *windows*,*files*, *menu*, and *mouse* have new meanings and mental images; headlines include such prefixes as *cyber*, *e-*, and *hyper*; media ads and discussions include such terms as *dot com*, *url*, and *www*. Clearly, ad creators, writers, editors, and producers assume that members of the reading public understand this new language. These vast lexicon changes reflect not only a vocabulary shift but also a thinking shift. We have new "pictures" in our reading and listening memories, pictures which have moved into our daily communication.

Besides the dynamic impact of technology on our vocabulary, technology has also brought us an

expanded view of "what is considered text and how text is prepared" (National Council of Teachers of English, *Guidelines*, p. 8). The Internet, hypertext documents (like the ones in this online journal), web sites, bibliographies with url addresses, e-mail, and personal web sites (visual representations of ourselves and our work) all are different kinds of texts, different genres with their own emerging characteristics. In English language arts teacher preparation programs, we need to address these literacy shifts, varying text forms, and the attendant skills new teachers will need to both use and teach these new texts and languages.

Just as technology is influencing language and reading, it has already had an impact on writing and teaching writing. As students use computers more (pen and paper less) to compose, the way we teach writing is greatly affected. Seeing a student's writing drafts in process will be harder because they will embed and internalize their own recursive writing process. In turn, instructionally guiding students through their writing process will be more challenging. However, we do not need to abandon our awareness that "both oral and written discourse contain like elements and follow processes that teachers need to understand in order to help students develop and extend communication skills" (NCTE, *Guidelines*, p. 16). Rather, we need to acknowledge that "technology has enlarged these processes to include visual discourse...[which is] closely linked with oral and written discourse" (NCTE, p. 16).

> **Example:** To help preservice teachers see the impact of technology texts on reading, we can ask students to examine and reflect on their own processes as they read such web sites and online documents. Such an examination reveals that in the electronic environment we not only read from left to right and top to bottom. We also read "in" on a passage, a highlighted phrase, picture or an object to read further and find details. Then we read "out" again as we follow a textual journey on a series of web pages and hyperlinks.

By the same token, students discover that as they compose web sites, online documents, and email they stretch the boundaries of linear texts and traditional modes. Hyperlinks may replace footnotes; web sites provide further explanations; and images become windows to more information. This kind of examination and reflection is the "text" of a methods class that infuses technology: students do English language arts and English language arts pedagogy *through,with,* and *about* technology.

Principle 3: Model English Language Arts Teaching and Learning While Infusing Technology

One of the critical lessons to learn as a teacher in a technologically rich environment is that we will never be completely caught up; we will never know everything. We will constantly learn with and from our students. As a result, the English language arts classroom will necessarily become learn**ing**-centered and learn**er**-centered, with both teacher and student functioning in both roles. To ensure that our soon-to-be teachers understand this shift, we need to create and model how this kind of classroom looks and functions.

> **Example:** In a writing methods class, for example, the teacher educator can model such important instructional messages as the value of teachers' writing with students, sharing their own writing, participating in response groups, and publicly developing their writing through a recursive process. Technology assists this modeling when we project our processes, respond to students' writing online, and participate in the class NetForum.

At the same time the teacher and students are using technology to aid their own writing

processes, the teacher demonstrates the MOST important element of modeling technology integration—taking risks, trying out new technologies with students, and relying on the students to supplement their instruction. In Carol's teaching writing class she relies on students to help each other, to demonstrate technology processes she does not know, and to teach new skills and applications. Thus, the methods classroom becomes a shared teaching/learning environment for both students and the teacher.

Principle 4. Evaluate Critically When and How to use Technology

The late Dr. Stephen Marcus (University of California, Santa Barbara) said in a conference presentation on integrating technology that "`Literacy is knowing where the truth lies.' He deliberately implies two meanings with this statement: people need to develop the necessary `reading' skills to enable them to seek out and identify sources of honest, straightforward, `truthful' information; and they also need to detect and read accurately those electronic texts that distort the truth. The skills of analysis, synthesis, and evaluation have always been important reading skills for students to master; but now, with the presence and operation of the Internet, these skills have become critical tools for the literate person." (Golub, 1999, pp. 53-54)

Teacher educators, as well as our students, need to be critical consumers of technology, to be thoughtful users who question, reflect, and refract (Pope, 1999) on the best times and ways to integrate technology. To be models of this process, we need to be critical evaluators in our own methods classes and involve our students in that process. The goal of this critical analysis of technology integration is to articulate and internalize a process for questioning and probing both the why and how of infusing technology through various applications, programs, web sites, methods of teaching, or communication tools. If teachers use this process, they will become teacher-researchers in their own classrooms. They will systematically pose questions, examine when it is appropriate and useful to integrate technology and when it is not, and follow through with the implementation and evaluation of the technology use. In such a process they will be "informed, adjusted, or validated by systematic classroom observation" (Selfe, 1992, p. 33). They will seek to discover "where the truth lies."

> **Example:** One question Carol and her students recently pursued involved comparing peer response face-to-face versus through e-mail. After participating in small group writing response groups followed by giving/receiving writing responses through e-mail, the preservice teachers listed advantages and disadvantages of both methods. While the students overall preferred the face-to-face response group experience, they also pointed out the value of e-mail for shy students, for those who lack confidence in thinking, speaking, and responding quickly in the group, and for more in-depth responses. In the end the students pointed out a critical factor: the type of response needed might be dependent on where the writing is in the process—that is, does the writer need and want primarily encouragement or longer, more detailed responses? Different methods, whether electronic or not, should be determined based on the context of the students, their needs, and the assignment. The "truth" in this circumstance is context responsive.

Principle 5. Provide a Wide Range of Opportunities for Using Technology Within the Content

According to Bertram Bruce, students should "learn technology, learn through technology, learn about technology" (1998, p. 222). To provide diverse experiences and perspectives, we can infuse opportunities for students to learn to work the technology itself and to develop those

technological skills through the study of English language arts content as well as the English language arts content pedagogy.

> **Example:** or example, by saving drafts of their writing in individual e-folders which are situated within the class e-folder on a server, students learn a technology skill while also using the technology as writers who save their texts in process. As they then consider how and why they might use this class folders set-up and process when they become teachers, they are reflecting about technology and its real application.

Possibilities abound for the integration of technological opportunities that relate to English language arts content. Students can create web sites, "read" the Internet, participate in online discussions (ListServes, real-time chat rooms, asynchronous discussions, videoconferences), and use all kinds of writing process skills on computers (create texts, add graphics and pictures, determine appropriate formats, revise extensively, and edit). The content and pedagogy merge in such experiences.

Principle 6. Examine and Determine Ways of Analyzing, Evaluating, and Grading English Language Arts Technology Products

Technology products are new genres for most of us, and they require a new set of process skills. Understandably we may be uncertain about how to evaluate the students' process, the quality of the work, and the product itself. When we infuse technology into our English language arts teacher preparation programs, we as teacher educators come face to face with these challenges. We are pushed to examine and think about these new-found forms, genres, and products. With our students we can work to determine the best ways of evaluating and grading them.

We can make these kinds of decisions by (a) keeping the content up front—that is, what is the content of the product? (b) determining the objective for the project itself—that is, what was the goal of the process and the product? what were students to learn? (c) using that information to create rubrics and evaluation descriptors.

> **Example:** One way of finding appropriate evaluation and grading processes for technology products is to have students locate a variety of web sites on a subject and analyze their parts and effectiveness. Recently in a methods class Carol asked her students to locate several web sites on Martin Luther King, Jr., analyze them for their effectiveness, and then develop an annotation as a review of the best sites. In this process the students examined the visual appeal of the sites, the clarity and accuracy of the content, the links to other references, and the ease of access to information.

As the students reviewed and analyzed the sites, they began to pick out strengths and weaknesses of the sites. They could see the variability of quality as well as the appeal different sites might have to different audiences, depending on the viewer's purpose in reading the site. Through this process they began to determine the criteria they might use in evaluating and/or grading a student-created web site. If the criteria are determined by both the teacher and the students in advance, the process of evaluating and grading become more integrated into the instructional process, the English language arts teachers "use assessment outcomes to improve instruction" (NCTE, p. 26).

Principle 7. Emphasize Issues of Equity and Diversity in Technology Accessibility

According to the NCTE *Guidelines*, English language arts "teachers should be sensitive to student needs so that all students, regardless of differences, receive encouragement, support, and opportunities to learn" (p. 11). We need for our soon-to-be-teachers to both witness and

understand the diverse accessibility to technology their school and their students will have. And they must consider this variability in their class assignments, opportunities for use in the school day, and homework expectations. In our teacher preparation programs we need to reference this challenge in our own assignments, classroom work, and expectations.

We have also learned "over the last decade...that [computers] cannot be understood *simply* as tools, considered in isolation from the social, political, or economic contexts in which they are developed and in which they continue to be used. Technology...is a richly embroidered artifact of a culture" (Selfe, 1992, p. 29), and as teacher educators we and our future teachers need to acknowledge that fact. We need to devise ways of responding and coping with the inequities the division of computer access will be between poor children and the middle and upper class children.

> **Example:** For students to witness first-hand the variability of various school and student access to technology, Carol's students recently went in teams on a "We-Search" visit to area middle schools. In the schools they worked with local media resource personnel to visit classrooms, computer labs, storage areas, and teachers' offices. They discovered the vast differences among schools', teachers', and students' accessibility to technology. In their report to the entire class they discussed availability of technology as well as strategies they might use when working in that school as teachers of English language arts.

To see how one teacher specifically deals with some students' lack of accessibility to technology, they read, studied, and discussed a **MID*tech*** (http://www2.ncsu.edu/midtech/) interview with a second-year teacher, Angela Cooper (http://www2.ncsu.edu/midtech/spotlight/cooper/index.html), who works to provide everyone in her classes an equal opportunity to use the three computers available in her middle school classroom. By reading and discussing the interview with Angela, the students see how a teacher can cope with only a few computers and provide access to everyone as often as possible.

Implications

From these principles and examples of infusing technology into English language arts teacher preparation, clearly the classrooms of today and tomorrow will look very different. No longer will the teacher be the dispenser of information; teachers and students will be learners together

In such an environment students participate actively and directly in their own education. They will not rely solely on the teacher but will use the Internet and electronic tools and media to gather information and gain insights. "The increased use of the Internet and the proliferation of websites has brought about a new set of basic skills for students (and even adults) to master: information literacy skills. Paul Gilster, in his book, *Digital Literacy*, defines this kind of literacy as `the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers'" (Golub, pp. 52-54

This shift to a learning-centered classroom does not mean, however, that the teacher is obsolete. Instead, it demands that the teacher's role change from that of an "information-giver" to one of "designer" and "director" of instruction. Teachers need to design worthwhile problems for students to solve and worthwhile projects for students to pursue. As students work on these activities, the teacher "directs" the students, offering suggestions and serving as a respondent for their emerging insights.

Using the principles we offer above, we suggest that English language arts methods classes can infuse technology in a way that does not interfere with the content pedagogy but supports it in a way that actively involves students and prepares them with the technical and pedagogical skills for creating the new learning-centered classroom.

An Invitation

We invite you to respond to our principles, offer your own variations, and describe ways you have found to infuse technology in your English language arts methods classes and program. Please join our conversation through on-line responses and articles from your own work. Help us focus our thinking, practice, and research in this critical area of technology and teacher education.

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