Help! Third Graders Know More (About Technology) Than My Graduate Students!
Closing the Digital Divide

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Dr. Bruce Lewis
Assistant Professor of Instructional Technology
Gardner Center #09
158 East Main Street
School of Education
Freed-Hardeman University
Henderson, TN 38340

Abstract: EDU 506 seeks to address some of the issues of the digital divide among teachers and students and seeks to put the teachers at ease with the technology. Teachers who finish this class come away with a sense of expertise and, more importantly, are no longer afraid to experiment with the technology. Administrators expect teachers to be able to integrate the technology into their classrooms and EDU 506 accomplishes its task.

Much has to been written regarding the digital divide that seemingly exists in our nation and world. Indeed, the National Telecommunications and Information Administration (NTIA) has published a study entitled, "The Digital Divide: A Survey of Information 'Haves' and 'Have Nots' in 1997". Their subtitle is "Falling Through the Net II: New Data on the Digital Divide." Their study opened with these words, "The concept of 'universal service' in U.S. telecommunications policy has traditionally referred to the goal that all Americans should have access to affordable telephone service. As America has increasingly become an information society, however, that concept has broadened to include access to information services. Now that a considerable portion of today's business, communication, and research takes place on the Internet, access to the computers and networks may be as important as access to traditional telephone services" (NTIA, 1998).

Citing a request from (now, former) Vice President Gore, NTIA analyzed "telephone and computer penetration rates across the United States to determine who is, and who is not yet, connected" with the intent of assisting "policymakers as they consider steps to connect all Americans to the Information Superhighway." This survey used data compiled by the Census Bureau in October, 1997. The Census Bureau compiled this data through 48,000 door-to-door surveys; cross-tabulated "according o specific variables, such as income, race, age, educational attainment, as well as geographic categories (i.e., rural, urban, and central city, as well as by state and region). These tabulations permit

insights into the characteristics of Americans that have access to the information infrastructure, and those that do not" (NTIA, 1998).

Highlights of the study reveal that "as a nation, Americans have increasingly embraced the Information Age through electronic access in their homes. The 1997 nation-wide data show the following nation-wide penetration rates -- 93.8% for telephones, 36.6% for personal computers (PCs); 26.3% for modems, and 18.6% for on-line access (Chart 1). Compared to the 1994 survey results, the nationwide telephone penetration has remained unchanged. The computer penetration rate, however, has grown substantially in the last three years: PC ownership has increased 51.9%, modem ownership has grown 139.1%, and E-mail access has expanded by 397.1%" (NTIA, 1998).

Additionally, the digital divide among US households persists. "Despite this significant growth in computer ownership and usage overall, the growth has occurred to a greater extent within some income levels, demographic groups, and geographic areas, than in others. In fact, the 'digital divide' between certain groups of Americans has increased between 1994 and 1997 so that there is now an even greater disparity in penetration levels among some groups. There is a widening gap, for example, between those at upper and lower income levels. Additionally, even though all racial groups now own more computers than they did in 1994, Blacks and Hispanics now lag even further behind Whites in their levels of PC-ownership and on-line access" (NTIA, 1998).

The following represents some of the more significant findings regarding computers: "Although PC ownership has grown by 10-13 percentage points in all areas since 1994, central cities again lag behind the national average for PC ownership and on-line access (32.8%, 17.3%), as do rural areas (34.9%, 14.8%) (Chart 10). Urban areas are slightly higher than the average (37.2%, 19.9%). The West's urban areas (43.9%, 23.14%) rank highest in PC and on-line access, while the Northeast's central cities have the lowest penetration rates (24.7%, 12.6%) (Charts 19, 24). After accounting for income, there is not a significant difference between rural, urban, and central city areas for computer penetration (Chart 11), although rural areas still have a significantly lower rate for on-line access" (Chart 20) (NTIA, 1998).

"Bridging the Digital Divide" (Seiden, 2000) reminds us that "the NTIA researchers were only looking at **in-home use**" She quotes from the 1999 report from the Pew Research Center for People and the Press that "62 percent of workers go online through their jobs" and "75 percent of students go online through their schools". While these numbers are good, there is "strong evidence that schools in poorer urban and rural districts have not only less hardware, but less ability to train students." Therefore, "addressing the digital divide is not simply a matter of running wire and providing public computers--it is also a matter of ensuring that people have the **requisite skills** to use the technology and that they see the relevance of the technology to their lives. This gap is not limited to socioeconomic or racial differences, but includes gender and age differences, as well." (Reference & User Services Quarterly, Summer 2000, v39, i4, p329)

Seiden (2000) indicates that "the libraries in our schools, colleges, and communities are in a position to make major inroads in addressing disparity of opportunity and education, as well as access." She encourages reference and user services staff "to decrease the disparity between the information 'haves' and 'have-nots' by developing new services and programs with relevant content that would teach the intricacies of searching and evaluating information and would provide an understanding haven for those intimidated by the technology." (Reference & User Services Quarterly, Summer 2000, v39, i4, p329)

Craig A. Cunningham, director of curriculum for the Chicago Public Schools/University of Chicago Internet Project, writes in an article entitled "Improving Our Nation's Schools through Computers & Connectivity" that while the federal government and school districts have invested "vast sums" on computers, software, and technical support and are working to connect every school to the Internet in the hope of improving the nation's schools and closing the digital divide, "many of America's teachers are unprepared to use computers in their classrooms." He states that "about 1.3 million of the nation's 3 million elementary and secondary teachers feel only somewhat or inadequately prepared to integrate educational technology into their teaching" (Cunningham, 2001).

"Using computers at a higher level--to provide the virtual reality of journeying west across the plains on a Conestoga wagon, investing funds in a stock portfolio, or dissecting a frog--requires much more of teachers. They must have ready access to computers in the classrooms--requiring not only more computers, but also more complex technical support--as well as increased familiarity with the computer and software. Teachers must also alter their curricula, so that the simulation is not just an 'add-on' but a complement to their larger instructional goals. While intelligent and motivated teachers can master these programs, it is nearly impossible to push reluctant or hidebound teachers to use simulations effectively" (Cunningham, 2001). (See also Developing Critical Thinking Skills, Lewis, 1998.) Realizing a vision of computers as productivity-enhancing mindtools is more difficult still because it requires transforming classrooms into information-rich workrooms, in which students use the Internet as a huge repository of real-world data, images, text, and other resources (Jonassen, 2000). Student progress is assessed authentically through tasks embedded in the learning process itself: through some "performance" or "product," rather than a paper-and-pencil test.

While most teachers, obviously, have the necessary mental intelligence, desire, and disposition to succeed in a wired classroom, the teaching profession does have some who prefer delivering the prepackaged curricula of textbooks and worksheets as offered by many textbook companies, using traditional tools for which they have received training long ago, and assessing student progress in traditional paper-and-pencil ways. Simply because schools across the nation will employ new teachers in the next few years who are more technologically oriented or more enthusiastic about new modes of teaching and learning does not mean that these new teachers are any more likely to integrate technology into their teaching than are 20-year veterans. "Even though younger teachers tend to be more astute in their own use of computers, the skills don't carry over to their teaching" (Cunningham, 2001).

Cunningham (2001) charges that many teacher training institutions fail to use computers effectively to train teachers. Stating that "Teacher educators as a group are even more technologically inept than are elementary and secondary teachers." This is further complicated by what he views as our inability to attract more intelligent students to the field of education – a point that many of us would debate.

Cunningham (2001) continues by observing that "today's investment in computing for schools is unlikely to close the widening gap between those in our society who have access to, and know how to use, information technologies and those who do not. Indeed, placing the computer at the center of school routines will only increase the educational advantage of students for whom computers are just a fact of daily life. Putting computers in the classrooms of such students may increase their opportunities to learn (provided that their teachers know what to do with the computers). But for students without such a comfort level, the demands of the computer will be a distraction from reading and writing and figuring or will become just a very expensive version of a textbook or workbook." He calls for "a massive effort at teacher training--not one-shot in-service workshops, but comprehensive professional development that makes possible the kinds of changes in instruction that improve student performance on higher-level thinking tasks." (Brookings Review, Winter 2001, v19, i1, p41)

Dr. Steve M. Dorman's (2000) article, "Implications of Growing Up Digital" addresses the attributes of the Net Generation (N-Gen), a term used by Donald Tapscott in his recent book, Growing Up Digital. The N-Geners are "the generation of children currently between ages 2 and 22 who represent the first generation to grow up surrounded by digital media." The computer has always been present in the lives of these children and they feel more comfortable with computers than do their parents, or teachers! They play, learn, create, communicate, and work using a computer on a regular basis.

The N-Geners are described as "accepting of diversity, curious, assertive, and self-reliant." N-Geners are information seekers rather than passive information recipients. Their access to the vastness of information presented on the Interact allows them to easily confront information they believe to be incorrect. They are "at ease with new technology and media, and they are not fearful to try new ideas and products." They seem interested in "how to make technology do the things they need to happen. They have an equal interest in how technology works. For example, they are not satisfied to use another person's website for link information. They must create their own web pages and links" (Dorman, 2000).

Implications on education and learning include predictions that "education will shift from a broadcast type of learning as demonstrated with a teacher in front of a classroom of students ("the sage on the stage" idea), to a more interactive learning facilitated by technology ("coaching from the sidelines"). The approaches to learning "will become less linear and sequential and more hypermedia driven; less teacher-centered and more learner-centered; and less instruction-oriented and more discovery-oriented" (Dorman, 2000).

Dorman (2000) concludes by saying that "technology will obviously shape the values, ideals, and interests of this group of emerging youth. Those of us who work with children and youth must prepare ourselves to understand better the technologically dominant world in which they live." (Journal of School Health, Dec 2000, v70, i10, p420)

The Graduate Studies in Education program at Freed-Hardeman University currently has about 460 students enrolled. Some 250 of these students are making career changes and are seeking initial teaching licensure, along with the M.Ed.. Most of the remaining others are active classroom teachers working on either an M.Ed. degree, an add-on endorsement at the graduate level, or the +30 (hours of graduate study).

To address some of the issues of the digital divide among teachers and students, the five projects of EDU 506 Computer Applications in Education seek to put the teachers at ease with the technology. Teachers who finish this class come away with a sense of expertise and, more importantly, are no longer afraid to experiment with the technology. Administrators expect teachers to be able to integrate the technology into their classrooms and EDU 506 accomplishes this task.

One of the first things that the author does with the students in his class is to assess each student's current level of technology expertise using the Self-Evaluation of Technology Skills. This is a modified form based on the Mankato Scale first developed by the Mankato (Minnesota) Public Schools to measure the growth of staff technology skills and further revised by the library media specialists and teachers of the Bellingham (Washington) Public Schools.

While most of the areas address professional productivity, such as writing lesson plans, record-keeping of student attendance and grades, etc., some of the areas also involve finding and evaluating material on the Internet and using e-mail for parental contacts. The score derived from this assessment is used to divide the class into dyads such that an experienced student works with a less experienced peer.

It is the author's impression, from having taught nearly 225 of these graduate students over the past couple of years, that there is a vast array of technological competencies represented by our students. Some of those seeking initial licensure are making career changes from non-technical fields and have had few computer experiences. Others have had extensive experience with word processing programs and the Internet, including e-mail, and some few have had a business background requiring the use of spreadsheets and record-keeping software. Most of our active classroom teachers, on the other hand, usually have had little experience with anything but the most rudimentary technology components and applications. In the author's opinion, this last group (experienced teachers) is often the most difficult to work with due to technophobia and a resistance to change.

The EDU 506 class, therefore, also attempts to narrow the digital divide that seems to exist between the various participants in our graduate program. Not only are various applications taught, but ways to integrate the technology into the classroom are explored

and practiced. Five major technology components are used in the class, including e-mail, Internet research, Powerpoint presentations, spreadsheets, and WebQuests.

After the class has been at work for most of the semester on various technology projects, particularly keyboarding and mouse skills, word processing applications, and e-mail, they are taken to the Scope and Sequence of Technology Skills (much borrowed, with thanks, from Eagle Lake Elementary, Mankato, MN). Eagle Lake has a range of technology activities for K-5 students in word processing, basic computer skills, e-mail, multimedia (HyperStudio), CD-ROM use, keyboarding, drawing and painting, spreadsheet use, and World Wide Web navigation. As we view together the depth and breadth of the range of technology activities that Eagle Lake is requiring of its K-5 students, it begins to dawn on them that "Third graders know more about technology than I do!" Some in the classroom are already aware that their elementary students are able to operate the technology and applications software much easier than they and that most of their students are much more at ease around computers than they are. FHU's EDU 506 addresses some of these issues of the digital divide among teachers and students and puts the teachers at ease with the technology.

The posting to the Internet of some of our projects allows the students to demonstrate their expertise to others and to share their projects with fellow teachers. Educators who use web-enhance delivery of lessons tend to be highly motivated people who thrive on creativity and enjoy learning. By sharing what we have created on the Internet, we also appreciate the feedback that comes from other professionals who have viewed and used our pages. Our class fosters a supportive and professional feedback loop so that we can all create the best learning experiences for our students.

Some of our students have gone on to complete additional web-based learning projects of their own. Most of these independent projects reside on their individual school's intranet, but a few have been published to the Web, such as Kim Fussell's Developing Tennessee Pride. One of the former students of our graduate program, Mrs. Stacey Valle, is now the webmaster for her school, Pin Oak Elementary School, in Lexington, Tennessee. Others continue to integrate technology into their classroom lessons on a regular basis.

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