Updating the textbook through technology- a diverse class seeks the solar system

EILEEN N. ARIZA
Florida Atlantic University

RICHARD KNEE
Florida Atlantic University

DEBORAH HOPP
Country Isles Elementary School

In the drive to improve educational excellence throughout the United States, standardized testing and academic benchmarks have become prominent goals for all school districts. Unfortunately, with so much time devoted to preparing for major standardized testing, science and social studies have been relegated to the status of mere afterthoughts because the continual existence of a school may depend on the test scores. This article narrates the experience of one teacher who improvises her own method of integrating science through technology. In the process, her diverse students discover through their research that their science textbooks are outdated. As a result of this inquiry process, students: Increase their academic and research knowledge; gain valuable experience by working cooperatively while sharing computer time and space; and help one another update the information in their textbook.

Many school district policies place such strong focus on preparing for statewide-standardized tests that science and social studies have been relegated to the status of mere afterthoughts. While teachers may touch on these subjects, or integrate them into the curriculum, social studies and science are not even graded on report cards. It is especially difficult for those teachers who feel they have to devote almost their entire school year prepping the students for standardized national or state exams. The academic life of a student or a school revolves around

these test scores. Passing scores mean the school gets a high grade, students are promoted, and continued funds are awarded to the school. Failing scores are the kiss of death and the fallout will have a domino effect: students may be retained or will be obliged to attend summer school; schools may lose vital funds; teachers in poorer schools may bail out in mass exodus; and parents may seek other schools. Therefore, as in many other realms, teachers must take their own initiative if they want to expose their students to science and social studies curriculum.

One such teacher, Ms. Deborah Hopp, took the issue of integrating science a bit further. As a new member of a teacher cohort (Ariza, Knee & Ridge, 2000), she began coursework towards a master's degree in Educational Technology. Ms. Hopp experiments with techniques learned in her Ed Tech classes and integrates them in her own fourth grade class of ethnically and academically diverse students who are Hispanic, Anglo, Korean, African-American, exceptional, gifted, and mainstream.

FRAMEWORK

Although this class is located in an upscale neighborhood, the subsequent methodology can be applied to schools in any economic setting because technology is updated and scientific discoveries are made faster than textbooks can be published. However, although this particular school is only thirteen years old, it has just recently been wired into the Internet.

One principle difference between this school and a less advantaged one might be the strength of their Parent/teacher Organization, which donated 26 I-Mac computers to the new computer lab. However, schools with less parental support could seek donations from private businesses, and sponsors. Along with the wiring and agreement provided by their country school board, the school has received 6 Ethernet printers and 10 new I-Mac's for individual classroom use. Ms. Hopp's fourth grade class has two 5500 Power Mac computers as well as two IBM compatible computers that were donated by students' parents.

METHODOLOGY – An Organizational Approach

The computer lab schedule is arranged so that no classes are scheduled for the first hour of the day. It is at this time that the teacher presents the project to be worked on later, either individually or cooperatively. Some partner projects use software such as Hyper Studio and mPower, which give the students the opportunity to guide each other through the process of learning, and complement each other's strengths. However, individual projects are also assigned and students are responsible for finding and presenting their own data found on the Internet. Hyper studio's multisensory approach to composing text, using graphics, sound and video intrigues even the most reluctant students as they create books, presentations, stories, games, and lessons (Dillner, 1993/1994).

Before expecting the students to complete an assignment on the computer, however, the teacher first models the appropriate steps for them on a large screen hooked up to one of the computers in the lab. Students have a chance to practice in the computer lab while the teacher attends to any problems the students are having at that point. After the conceptual kinks are smoothed out in the lab, they are ready to take their new knowledge back to the classroom for hands on practice.

UPDATING THE TEXTBOOK

We believe the most effective method of modernizing outdated information in the textbook is to integrate science with the latest technology. For example, during a lesson about the solar system, the teacher and students first explored the science book to find information about the planets. To their dismay, they discovered outdated facts in the science text. The power of the Internet can be utilized from any part of the world, and applies to every country because, as the teacher explained, scientists are constantly updating their knowledge base and are discovering new things about the solar system through technology and research. The children were then sent to the Internet to explore and seek any information they could find about the planets to provide

material for their Hyper Studio project. Individual exploration through an Internet fact- finding mission is a great way for students to see the disparity between textbooks and current research findings. By making their own discoveries, learning has personal meaning, and students proudly share their new knowledge with their peers. Through exposure to activities that generate collaboration with others, the learners create, analyze, and produce information, thus creating an electronic community with their peers (Lapp, 2000, Maring, Wiseman, & Myers, 1997, & Wilkins, 1991).

CLASSROOM PRACTICE

Before beginning the fact-finding mission, students needed to know the definition of a search engine, how they operate, and how they could be accessed. After explaining some of the differences in search engines, Ms. Hopp modeled the procedure necessary to use the search engine *Yahooligans* on the large screen viewing. They went through this search engine and some of the others together, and tried different searches on multiple topics before investigating the other search engines independently. They searched *Yahoo*, *Excite* and *AltaVista* for information on the solar system, but after about 20 minutes of "free-learn" time, they went back to the *Yahooligans* website to research facts pertinent to each planet. They compared the information found on the Internet with the information in the science book and were able to see how extensively the data had changed. This was tangible proof that scientists are always coming up with new and more current data and was a profound revelation made more apropos because it was discovered by the students on their own. Research shows that students learn best, faster, and retain information longer when they are actively involved in their own educational process (Beckman, 1990; Chickering & Gamson, 1991; Newby, Stepich, Lehman & Russell, 1996).

ORGANIZING COMPUTER TIME

After the hour-long mini-lesson and trial and error period was over, the students returned to the classroom. Since there are only two computers in the classroom wired to the Internet, students have to

learn to work cooperatively in the computer station. The teacher created a checklist of students' names in the order that was most appropriate for her class. Each pair of students had 15 minutes to work on the slideshow. At the end of fifteen minutes, they saved their work and called the next group up to the computer. With this routine, no discrepancies arose concerning whose turn was next and who stayed on the computer too long. Students showed consideration for each other's needs and helped each other when technical steps were forgotten or not understood.

Only two students were on one computer at a time and they took turns with a partner as they followed the same steps they practiced together in the lab. This method of practicing what they learned reinforced their new knowledge base and compounded their prior knowledge. (Smith & Ragan, 1999)

As a general rule in Ms. Hopp's class, students are allowed to use the computers anytime during seatwork activities and know that if they do not complete their assignments, the responsibility to make it up is theirs. Problems regarding incomplete work are nonexistent because students are aware that the consequence for not turning in work is the loss of computer time. To limit the number of students wanting to use the computer at the same time, a checklist is set up in the computer station area. Students may not use the computer more than two times a week during seatwork time. The computer is available for use during any research activity, after reading groups, during recess, and when all assigned work is complete. An important rule that works in this classroom is that computers can only be used during times when the teacher is not "lecturing", or teaching in the front of the room.

Just as teachers have their own way of managing their class, computer time should be determined by what is most convenient for the teacher as well. It is important to avoid becoming overwhelmed with students missing assignments due to computer use by teaching them the rules and consequences first-- then let them become "responsible citizens!"

OUTCOME

Modeling and practicing are the two most important keys to a successful computer lesson (Kemp J., E., Morrison, G., R. & Ross, S., M, 1998). The effective teacher models what the students need to learn, and then allows them to experiment on their own. As a direct result of modeling by the instructor, and being allowed to experiment, this class of students has enhanced the school website, made slide shows using Hyper Studio, and used the Internet as a primary resource for research.

One of the most important advantages of the use of computers and technology is that students learn at their own pace, according to their previous computer skills. Often they go beyond what the teacher models, and even discover new computer "tricks" that they share with the class. However, the students in Ms. Hopp's class have received other benefits as well. In addition to expanding their academic knowledge, the children have gained valuable experience by working cooperatively, sharing computer time and space, and helping one another-- skills that will help them become responsible citizens in and out of the classroom.

THE AUTHORS

Dr. Eileen N. Ariza is an Associate Professor of ESOL at Florida Atlantic University. Co-author of several textbooks and journal articles, her research interests are pre-service and in-service teachers and teaching academic content to English learners.

Dr. Richard Knee, Associate Professor and Associate Dean of Technology at Florida Atlantic University, teaches courses on integrating technology in education.

Ms. Deborah Hopp is an elementary school teacher at Country Isles Elementary School, Weston, Florida. She is completing her Master's degree in Education Technology at Florida Atlantic University.

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