With the right answers
to three basic questions,
technology can be an
integral part of teaching
and learning.

Integrating Technology Three

By Keith E. Polonoli

alk of integrating technology is omnipresent in education. In a generic sense, the term *technology* can be used to identify the myriad objects that are used to benefit people; nevertheless, in educational circles, the term *technology* usually fosters images of the microcomputer. *Multimedia, hypermedia, computer-based instruction, computer-assisted instruction,* and *computer-managed instruction* are just a few terms one encounters while traveling through the technological maze. The terminology may be a little confusing, but the positive effect of technology on learning—when it is infused into the classroom in a pedagogically appropriate manner—is quantifiable.

Research studies, although sometimes methodologically flawed, purport educational benefits when using technology in the classroom (Weglensky, 1998). In response to these findings, schools are now acquiring computers, software, and peripherals in large numbers. To substantiate this statement, I found that the federal government dedicated $698 million to educational technology programs in fiscal year 1999 (McAllister, 1998).

To seamlessly integrate the hardware and software purchased with those funds, many educational systems have turned to hiring technology resource staff members in the hope that those specialists will help construct an educationally sound technology integration plan (Becker, 1998). I recently served as a technology resource specialist with the Frederick County Public School System in Winchester, VA, and had a similar job description.

My position gave me the opportunity to work with a group of dedicated principals who are adamant about each student reaching his or her maximum potential. Administrators know that if we raise the expectations placed on our students, teachers must challenge themselves to seek new and innovative approaches to instruction. This challenge will encourage teachers to use all of the instructional tools available, and the computer is an excellent instructional tool that is readily available in most schools.

With this in mind, my purpose is to help educational leaders gain insight into what constitutes sound technology integration, minus the esoteric language. From my experience, many principals feel inept when it comes to

understanding technology integration. Educational leaders sometimes feel that their lack of technical mastery of the computer is a hindrance in their understanding of proper integration into the classroom. Nonsense. A principal need not be a computer expert to understand the best practices of technology integration; nevertheless, a firm understanding of what constitutes good pedagogy is essential.

The Principal's Role

Mandates

A relatively new initiative in education, instituted through governmental mandates, is for teachers and students to become familiar with and use technology (i.e., computers). Any individual involved in the labor of love that we call education is aware that classroom teachers are initially responsible for instituting strategies to meet mandated standards. Nevertheless, ultimate accountability for successfully attaining those goals rests on the shoulders of administrators.

Finding new methods to teach content in a manner that results in greater educational gains for students is the quest that all educators undertake. And infusing technology into classroom practice would be the right thing to do, even if government mandates did not exist. Thus, it makes sense for educational leaders to familiarize themselves with technology and the most effective methods to integrate it in teaching.

Changing Instruction

The approach to instruction must change if teachers are to integrate technology into their classrooms, but changing a teacher's instructional manner is no easy task. Research has shown that teachers' patterns of classroom instruction remain consistent over years (Cuban, 1993). Therefore, simply asking a teacher to integrate technology into the classroom is an exercise in futility. What is needed is a shift in thinking so teachers will come to view technology as an effective tool to use throughout the course of planning instruction, not something that must be used to meet a government-mandated technology standard.

So, who will be the catalyst to initiate this shift? Becker and Ravitz (1999) tell us that an educational culture supportive of change is necessary if a general transformation in instructional methods is to occur. Like it or not, principals are the protagonists when it comes to creating a positive

school culture (Peterson & Deal, 1998). Simply put, a principal is responsible for fostering a supportive climate. Without administrative support, integrating technology into the classroom is dead before it even begins.

Nature of the Questions

To initiate this needed shift in instruction, I propose that administrators begin by asking themselves three questions to evaluate the status of technology integration in their schools. Asking the questions and then reflecting on the answers may help a principal glean some insight before tackling the daunting task of helping teachers rethink their philosophy toward instruction and their classroom practices.

I have used current literature and my personal experience as a technology integration specialist as a basis in formulating these questions, and I have shared some personal experiences to add a human dimension to this issue.

The questions are reflective in nature. Formulating a direct answer to each is not necessary: it is not in their design and it is not my intent. As for gathering information for reflection, natural observations should prove quite effective (Patton, 1987). Casual conversation with colleagues or observing the computer lab or classroom should help tease out appropriate data. In addition, because the questions are broad in scope, they will probably spawn queries that focus on technological issues germane to individual district goals.

Further, each question, or "Big Q," as I like to call them, correlates to a major area of current concern regarding technology integration. The first question addresses the phenomenon of teachers becoming so enamored with technology that they lose sight of their instructional objectives. The second question targets the ill-perceived notion that newer, faster gadgets translate to better tools for learning. Quintessentially, question two examines our misguided desire to look first for answers through the application of technological fixes rather than finding solutions within the human context. Finally, the third question focuses on identifying proper faculty support initiatives.
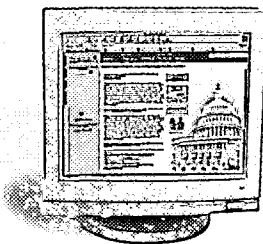
The Big Qs

Does the technology enhance the objective of the lesson or does it overshadow it?

During my doctoral training at West Virginia University, I team taught a course each spring semester called "Learning in an Educational Setting." The course had an average enrollment of 130 preservice teachers and had three objectives:
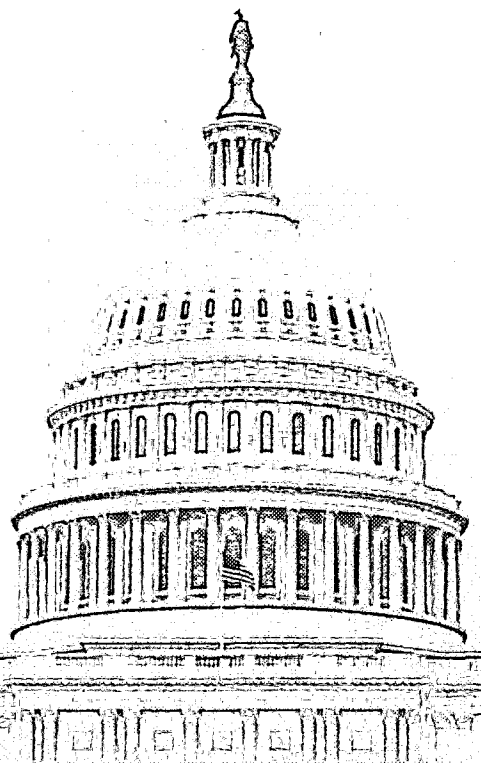
teach students how to write instructional objectives; familiarize students with the basics of currently accepted learning theory; and teach students the computer application HyperStudio, a simple software-authoring program.

As my colleague focused on satisfying the first two objectives, I concentrated on the third objective. My approach was to act as a mentor to the students as they developed a piece of instructional software. I was to make sure that their products were based on well-conceived instructional objectives and currently accepted learning theory. My partner and I established a schedule that allowed us to teach the technical skills congruent with the core content of the course.

About one-third of the way into the course, I posed some seemingly inconspicuous questions to my students regarding writing instructional objectives and learning theory. I was impressed with their knowledge. They definitely had command of the concepts. In addition, the students easily mastered the technical aspect of learning the intricacies of HyperStudio.

As the semester progressed, I noticed that students began to ask increasingly sophisticated questions, but the questions were not content-related, nor did they deal with instructional objectives or the learning theory discussed in class. Instead, the questions focused on the technical capacities of HyperStudio. This proved to be the harbinger of pedagogical doom.

Many of my students suffered from what I coined as the "Where's the beef?" syndrome. The software produced by my students blinked, flashed, played sounds, and displayed some eye-catching video, but regretfully, their products lacked any substantial content. Further, with no content to speak of, their projects lacked an instructional objective and a theoretical base.

My advice is simple: be certain that teachers are focusing on learning objectives before addressing technology. Subsequently, be certain that the use of technology by teachers is rooted in some theoretical context that will use the technology to enhance the content. Do not allow the media to mask the message.

Are teachers using the technological resources currently available before requesting the purchase of new ones?

This question has caused me an immeasurable amount of frustration. Here is the scenario: schools have the latest hardware and network technology in place; schools have a good number of appropriate educational software packages available for teachers to use; teachers are instructed how to use the hardware and the software; teachers make only cursory efforts to use the available hardware and the software; teachers want new hardware or updated versions of software.

Consequently, I can be found at the end of the day wearing a pensive look while I ask myself, "What are teachers

doing in the classroom that necessitates the purchase of new hardware?" "Nothing," is my usual answer. Another question I often find myself pondering is, "Has the software that was initially purchased lost its educational value?" "No," is my de facto response.

Yes, I sound cynical, but I concur with McKenzie (1999) who states that we have placed so much emphasis on the hardware and software aspects of technology integration that we have ignored the human factor. As professional educators, we know that learning not only involves the cognitive domain but also is contingent upon the often-neglected affective domain (Krathwohl, Bloom, & Masia, 1964). Try to gauge your faculty's perceptions and feelings toward technology before signing purchase orders for the latest and greatest equipment. Without a positive view of technology, it is doubtful that new gadgets will spur hesitant teachers to use technology in their classrooms. Granted, hardware occasionally needs replacing and software becomes dated, but it seems that new, high-tech tools are often too glamorous to resist.

Since 1543, when Nicolas Copernicus's work *De Revolutionibus Orbium Caelestium (On the Revolution of the Heavenly Orbs)* was published, modern man has been inculcated into thinking that solutions to all of our problems reside in technology. Science has given us such wonderful things as Twinkies that can stay fresh for six months on the grocer's shelf and miracle vaccines that can prevent such debilitating diseases as polio. A price, however, has been paid for those miracles.

I believe Eric Hoffer, the American author and philosopher, best explains what I am trying to convey with this quotation: "Where there is the necessary technical skill to move mountains, there is no need for the faith that moves mountains." Administrators, looking for a technological fix for educational problems, ignore the human spirit, which must be the true focus of both teaching and learning.

What type of professional development is available to faculty members?

The authors of the *Report to the President on the Use of Technology to Strengthen K–12 Education in the United States* (1997) suggest dedicating at least 30% of all federal expenditures for educational technology to professional development. The report goes on to state that professional development activities should not only aid teachers in learning the available software packages and proper use of computer hardware, but they also should give teachers access to consultative support, ongoing mentoring, and an open forum to discuss technology integration with peers.

Most educators agree that support for teachers is needed,

but do not be lured into thinking that an active inservice training program for teachers is the answer to the integration conundrum. These isolated "after-school specials" are about training, not learning. We wrongly believe that hardware knowledge and software knowledge translates to classroom use (McKenzie, 1999). Nothing can be further from the truth.

McKenzie (1999) states that teachers will use technology in their classrooms only after personally experiencing the power of technology as an effective teaching tool. Unfortunately, this is not accomplished by having a somewhat misled, but otherwise well-meaning, teacher perform an inservice program for 15 social studies teachers on how to construct a database of U.S. presidents using Microsoft Access.
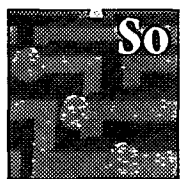
So what professional development activities should we undertake? I have found one-on-one interaction—a mentoring relationship—between an integration expert and a classroom teacher to be the most effective form of staff development. Mentoring allows faculty members to work on their own computers; solicit answers to software questions and integration problems that they deem personally important; and ask questions without the fear of embarrassment, which is more likely in a group situation.

Mentoring can hold the key to successful integration. Hale (1999) reports that mentoring takes on four stages: *coaching*, in which the learner is engaged in the process but does not actually own it; *guardianship*, in which the mentor delivers advice and acts as a role model; *counseling*, in which the mentor is the learner's psychological supporter; and *facilitation*, in which the mentor is helps the learner take control of his or her own learning. In education, we seem to focus only on the facilitation stage. We forget that coaching, guardianship, and counseling are necessary steps to reach our goal of facilitation. This is a long process. Be patient. Allow the mentor (technology resource specialist) and protégé (teacher) relationship to develop.

A one-on-one approach to staff development is the ideal situation, but we don't live in a perfect world. The crux of the matter is that good professional development translates to building strong, nurturing relationships between integration experts and classroom teachers. This cannot be accomplished through a half-day workshop or a four-hour inservice program. Nevertheless, I do not wish to imply that all workshops or inservice programs are wastes of time. They do offer a number of useful ideas to teachers. The point is, successful integration of technology into the classroom will never occur if we do not concentrate on building these mentor–protégé relationships.

Summary

The simple questions posed here should form a base from which an educational leader may start the journey of assessing the use of technology in the classroom. Allow common sense to guide you on this odyssey. Garnering observational data by using these questions should help stimulate deep, reflective thought on this matter. The reward will be a catharsis of knowing that the crux of the integration issue is not really about the technology; it is about pedagogy, which is something all principals understand. **PL**

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