Computers: From Confusion to Collaboration

Educators and computer professionals can work together to adapt new technology to education.

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A new school year brought with it a change in administrative assignment and on opening day I arrived at the doors of the Cameron Middle School with a carefully prepared list of professional goals.

Nowhere on the list did it say anything about computers.

I have never deliberately ignored computers and had every good intention of investigating them—one of these days. Within the first two weeks of school, "one of these days" arrived in the form of three events leading to an immediate change in the priority status of my technological "to do" list:

• Someone forgot to tell a group of computer-literate ten-year-olds that this impatient technology had not been included in the curriculum or on my list of educational objectives. One sixth grader completed a writing assignment at home on her personal computer. She used a word processor and a Spelling Editor (a program capable of reading and correcting all spelling errors on a ten-page paper within 30 seconds). The teacher sent the student to the office for discipline. He didn't think this should be allowed. It was unfair to other students and furthermore, how could the student ever learn to conquer cursive writing or basic spelling skills?

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• While touring the building I found three brand new microcomputers. Purchased the previous year, they were now being stored in the back of the math room waiting. . . .

• The PTO offered to raise money to buy additional microcomputers. The message was strong and clear. In spite of tightening fiscal restraints, parents wanted computers to become part of the school experience. They were afraid their children would be deprived of career opportunities and be educationally disadvantaged unless they possessed computer skills.

Tackling the Topic

I made a decision to learn all there was to know about computers and saw no problem in meeting this goal. Two books ought to do it, I thought. The first would explain in gentle, nonthreatening terms all the technical functions and capabilities of the computer. The second would describe all learning programs (software) and a systems approach for integrating computers into the classroom.

But the books I wanted did not exist. We are hurtling through a technological renaissance so fast that books can't be written, printed, and published fast enough to keep pace. I turned to periodicals, professional journals, computer newsletters, throwaway magazines, trade journals—and junk mail. Weekly trade journals were helpful because they could afford to publish ideas that might be outdated on the day of publication.

I read and read—and read more—struggling to understand and come to terms with a new and very technical vocabulary: information technology, knowledge engineers, information specialist, nano-seconds, bits, bytes, mega-

bytes, kilybytes, software, hardware—the language of power. It was a vocabulary telling me that education can no longer use a traditional lens to view, interpret, or make decisions about the once autonomous world of the classroom.

Initially the neologisms intimidated me and I felt angry and frustrated. Then I found myself beginning to use the vocabulary with confidence and just a touch of fraternal smugness.

An Elusive Difference

As I read, talked with my computer-literate sixth graders, attended seminars, and explored local computer stores, I found myself groping to isolate and identify the elusive quality that made computers different from the technology already stored in every schoolroom closet and media center in the country. Whatever it was, the computer wouldn't be ignored or sit gathering dust. I felt as if I were preparing for an uninvited guest who was about to eat my lunch, sit at my desk, and steal my job.

Take a moment to imagine:

• A single thumbnail-sized computer chip holding one million bits of information with the capability of processing it at a rate described in measurements of a trillionth of a second

• The human brain in the process of thought or a computer conducting research without human help

• Thousands of pages of numbers reduced to a single picture with relationships between numbers made vivid through the use of graphics

• Artificial intelligence enabling computers to mimic human thought processes, reason, make judgments, learn

Australian student—learners will have access to a variety of telecommunications devices and computers capable of exchanging stored information through totally integrated local, national, and global networks. Students will be free to engage in learning at any time and in any place, and the roles of schools, home, work, and entertainment will blur.

When I finally conceptualized this potential for an information network, I knew I had identified the significant difference. The capacity and power of networking takes away our freedom of choice about whether or not we invite information technology into the school house.

Confrontation and Fear

Putting computers into classrooms represents an enormous risk to teachers and makes incredible demands on educators and our capacity for change and our understanding of a teacher's role. It can be difficult to harness energy needed to confront the specter of unpredictable change represented by information technology. Change generates fear: fear of displacement and domination, of knowing less than the student, of loss of decision-making power, of loss of control over the learning experience, of equipment failure, paper work, and the breaking of the machine.

In addition students like the computer for the same reasons teachers dislike the computer.
It:

—Gives them a sense of control and power

—Allows active learning

—Demands interaction

—Makes the user the decision maker

—Allows the user to stop and start in the learning task when ready and motivated

—Doesn't get angry

—Gives immediate feedback

—Provides risk free simulations

—Provides a sense of mastery

—Is friendly, patient, and never gives detention.

The children are ready, the computers are ready, the dynamics are in place and we no longer have the luxury of time.

Acceptance and Action

I accelerated the pace of my learning and began to search out people who understood and had made friends with the computer, who were excited by the prospect of a network of information. But where do we go to listen or to join in on practical, theoretical, philosophical conversations about learning and the computer, the learning process and the computer, analytical thinking skills and the computer? I walked through school corridors, listened to teachers and administrators, attended school committee meetings; the conversations were directed at serious, joyless, stress-producing topics, such as limited resources and staff cutbacks. A survey-oriented, crisis-oriented mentality has paralyzed the professional educator's mind and spirit.

At the same time that it is becoming more difficult to involve public school educators in conversations about innovations in education, the corporate community seems more interested in such topics. Private industry has determined that information is profitable and is investing millions of dollars in developing the most cost effective strategies for acquiring it, storing it, retrieving it, and processing it. Corporate corridors buzz with "our" vocabulary. It appears that educators are being hit over the head with their own bats.

A Computer Advisory Team

A chance conversation at a dinner meeting one evening triggered the idea for creating a dialogue between educators and the corporate world. That night I drove home envisioning a room full of conceptual thinkers from corporate and educational communities working together, sharing ideas and information.

By the time I reached home I felt committed. I would build a network between professionals whose business it is to know about and professionals whose business it is to know what constitutes effective learning.

Although it would have to be beneficial to both groups, I needed people who would give freely of their time and energy unencumbered by the profit motive. I needed people who had a vested interest in learners and in the public school system. In other words I needed parents who were computer professionals. A request for volunteers willing to serve on an advisory team went home in the next newsletter. Within a month I had our first Computer Advisory Team.

I did not recruit the teaching staff for participation in the initial meetings. As members of an excellent school system they had been subjected to continued and severe trauma brought on by dramatic and swift declines in enrollment, reductions in force, and fiscal restraints.

● Computer motion pictures that let the eye see instantly the meaning of masses of data and complex relationships

● Expert systems no bigger than a calculator serving as "mind amplifiers"

● All the music ever written since the beginning of time stored on five computer disks

● All the words in all books in all libraries put onto super-chips and carried about in a suitcase

● A student in the Australian back country sitting down at a home computer to: set learning goals, assess needs, organize a work plan, take exams, consult with experts throughout the world, and complete a program of study without constraints of distance, time, or teacher absence.

How can the cloistered environment of the "school house" become part of an ecological system influenced by products and capabilities of an information technology of this magnitude? Like the

I wanted a stronger sense of the role of computers in education before I confronted them with what might appear another job threat. This was a mistake. The experience of learning in collaboration with the corporate community added a new dimension to my vision of education. It was exciting, refreshing, and professionally renewing and I very much wish I had shared it.

At the first meeting of the advisory team we sorted through our personal expectations about the group's mission. We shared concerns and questions and tried to objectively determine the degree of commitment each of us could make to goals we might set.

Over the next three sessions we examined the value of a systems approach to management of information technology. This operating strategy would provide criteria and direction for identifying information needs, setting goals, and organizing strategies for using information effectively and would enhance every educator's ability to use and interpret information technology. The group felt that intentional management as opposed to reactive management would ensure options supporting smooth institutional adaptation to critical change. We needed to assess conditions and changes in the external environment and relate them to internal needs and competencies.

Working with this dynamic group proved invaluable. Together we examined issues related to goal potential, technological capabilities, corporate resources, cost and financing and purchasing criteria, training, and the projected educational capabilities of computers. We covered these topics and more, and in addition to sponsoring a Computer Fair, we collated a list of key issues and concerns to be considered for the integration of computers into the school curriculum.

Step 1. Make a conscious commitment to the integration of computers into your school program. By invitation or default, computers are going to happen to schooling. To ensure an effective process of intentional management and decision making, the commitment to information technology needs to radiate from the school committee through the office of superintendent out into the system as a whole.

Step 2. Search out all available resources and read all available literature until you are comfortable with the language of computers and find yourself *able to think about them on a conceptual level.* Trade journals, computer magazines, software and hardware vendors, computer professionals, computer-literate children, *Business Week, The Economist, Info World,* and seminars can help.

Step 3. Establish and maintain a collaborative link with the technical and corporate community. Good networking will be the key to creative and productive use of computer technology.

Step 4. Identify those issues and implications that are likely to influence decision making. Human resource concerns: in other words, attitudes; job redesign; technological training; performance appraisals; financing the acquisition of hardware and software; rules and policies; statement of goals; evaluation procedure; management accountability.

Step 5. Enunciate the system's philosophy and intent and relate each to the role of computers and information technology in education. A position paper forces clarification of our motivation: Are we entertaining computers because we have been seduced by technology, pressured by parents, pressed by financial considerations, intrigued by the potential for management control, challenged by new learning options?

Step 6. Develop a management process that instigates and nurtures strategies for systemwide cooperation, communication, coordination. People need to know how the system works and to be able to count on time, places, and ways to share information and equipment, update skills, assess needs, set goals, evaluate progress, and to find and use resources.

Step 7. Designate an information systems coordinator. Computers are most often introduced into the system by individual staff members who have become intrigued by this new technology. They begin to chip away from the inside out to make room for the computer. It is more effective to appoint a staff member who possesses the combination of an understanding of the technology and proven teaching/training skills to coordinate and monitor a systems approach.

Summary

We have to do more than let computers "happen" to schooling. The information network increases our capacity for creating effective learning experiences and that is what education is all about. We must plan carefully to avoid shoddy, inadequate, and needlessly expensive use of computers in schooling.

The "knowledge engineer" and the educator can become co-designers in the future of education. Computers are creating an exciting new frontier, and we do not have to be mythical heroes to become participants in the adventure in learning. **EL**