Educational technology places new demands on school leadership. Those in leadership position will have to be technically literate and in the forefront of the technology revolution.

TECHNOLOGY LEADERSHIP: Moving Beyond the Photocopier

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A recent survey by the U.S. Department of Education, 84% of America's teachers consider only one type of information technology absolutely "essential": a photocopier with adequate paper supply (Telecommunications Policy Review 11/6/94, p. 1). Much rhetoric in the press and halls of government on the need for improving the American educational system has occurred in the 1980s and 1990s. Educational improvement has generally taken two approaches: (1) patching up or adding to the existing practices, and (2) designing a new model of schooling. The first approach came about as a reply to *A Nation at Risk* (National Commission on Excellence in Education, 1983). This type of reform was based in the assumption that the American system of education was providing graduates not capable of competing in the global work force because schools had become lax in their practices. Increased graduation requirements, increased formal educational requirements for teachers, more student homework, longer school days, and longer school years were among the recommendations for improvement. This effort for change was applied in improving how the teacher currently operated in the classroom rather than on adapting to teach the varied way students learned. The way classrooms operated changed little; the textbook remained the basic unit of instruction, instructors were the gatekeepers of knowledge and used "chalk and talk" to convey information to students, curriculum areas remained isolated from each other and most often from relevant application.

The second type of reform for the American educational system used the term restructuring popularized by *A Nation Prepared* (Carnegie Forum on Education and the Economy, 1986) and the Coalition of Essential Schools (O'Neil, 1990). The restructuring concept includes emphasis on the idea that most American children are capable of learning at dramatically higher levels of performance, student-centered learning with student understanding given precedence over content coverage, and measurement of learning in terms of performance in authentic settings rather than the scores produced on standardized tests.

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The use of emerging technologies has been a logical component of both of these movements to improve education. The U.S. Congress Office of Technology Assessment (OTA) has noted that educational technology has provided a strong catalyst for reform and projects that technology can be the key to higher levels of achievement by students (1988). The Clinton Administration supports the formation of information infrastructure to connect government, education, health safety, etc. (Vice President Al Gore, speaking to communications industry leaders, January 11, 1994). To this end, schools have been implementing computer and related technologies into curriculum and delivery models. A survey in 1993 by Princeton Survey Research associates found that computers were installed in 52% of U.S. public classrooms, televisions were in 41%, but only one-half of the televisions were accompanied by videocassette recorders. ("A technology revolution," 1994) The Software Publishers Association reported that expenditures on technology products by educational institutions increased from $1.785 billion in the 1991–1992 school year to $2.427 billion in the 1993–1994 school year ("Learning a costly," 1994).

These movements toward educational improvement have produced enhanced performance on traditional skills, however work today does not simply require more or less of the traditional education skills. The world in which today's adult worker lives is very different than their parents' or grandparents'. Children schools' are today teaching for a world drastically different than the one they now live in. Projections vary, but most futurists project that the world's base of knowledge is doubling every two to three years (McCarthy, 1991). Job skill requirements have changed at a rate four to five times faster than curriculum and organizational changes in our schools, leaving a gap between what students learn in the classroom and what is expected of them in the workplace. (Daggett, 1992) When today's students enter the work force, they will more than ever in history be required to learn new skills to survive. In the 1990's and beyond, people are expected to change careers every ten years on average and a recent survey shows that only thirty percent of workers intend to hold the same job five years from now (United Way, 1989). These predictions are already being felt and the American public has been voicing more concerns about the effectiveness of the American educational system to prepare graduates for the new world of work.

Levine and Lezotte (1990) outline strong administrative leadership as one of the correlates of effective schools. Fullan and Stiegelbauer (1991) emphasize the role of the building principal as an agent of change. It will take strong district leadership to transform education to a delivery model that incorporates the present world knowledge base to prepare today's students for their future work-world life.

What will a district technology leader need to know to empower the district to transform the educational process to utilize more informational technologies than the photocopier full of paper?

School districts involved in transformation to a technology learning environment that provides graduating students with working skills for the information-age will be required to have, or gain, the competencies addressed by Gerald Bailey's article on Technology Leadership. An individual technology leader for a school district, however, cannot be expected to have expertise in all ten button areas, but must have a firm understanding of the four P's of technology leadership: (1) purpose, (2) public relations, (3) preparation, and (4) power. These four competency areas do not stand alone, but encompass many skills that must be intertwined as a technology leader helps empower his/her school district to transform curriculum and delivery to provide students with an information-age education.

1. Purpose

A district technology leader must be ready to lead his/her district in preparing a vision or mission for educational transformation.

Technology leaders must work for school transformation with a purpose. School improvement with technology learning is more than putting computers in classrooms. A technology leader must have an understanding of technology learning and its role in the transformation of classroom learning in school improvement. The implementation of emerging technologies must be blended with a vision of the final product to be produced. The mission is to prepare students for a future of life-long learning. District technology leaders need to have a background in learning theory, authentic, relevant curriculum and delivery to develop implementation plans for emerging technologies. They must blend the school improvement process into a functional operating process that addresses improved student learning.

2. Public Relations

A district technology leader must possess knowledge of the change process and communication and interpersonal skills to prepare the schooling community for the changes associated with technology-based learning.

In 1970, Alvin Toffler defined future shock as the shattering stress and disorientation that we induce in individuals by subjecting them to too much change in too short a time. Since the changes that have occurred in American education in the last one hundred years have done little to change the model of the teacher as the gateway to knowledge, the implementation of strategies that put the learner in charge of learning is bound to produce future shock in the community and the school. Just as the need for districts to have technology leaders prepared to direct progress toward the 21st century was addressed at the start of this article, those district technology leaders must be prepared to communicate and "sell" the vision for technology's role in improved student preparation to the important target groups. They must understand the correlation between research on how learners learn and the transformation of curriculum and delivery. Technology leaders need skills for communicating the vision of the changed produced curriculum and delivery using emerging technologies to all affected groups.

3. Preparation

A district technology leader must lead the school district in preparation of strategic and short-range implementation plans that blend the areas of school transformation with technology learning process.

Many school districts have not planned for implementing emerging technologies that encompass all the areas of school improvement. Lumley and Bailey (1993) liken many school district plans for implementation of technology as rudderless ships. As an educational change agent, the technology leader must be prepared to lead the district toward the development of plans for improvement that blend changes in curriculum, teaching and learning delivery, emerging technologies, and staff development into a system that will provide the students a quality education.

4. Power

The most important competency the technology leader can have in leading the school district in transformation is the ability to mobilize the power bases of the school district and community.

"The classical definition of power is the ability to get others to do what you want them to do" (Hoy & Miskel, 1991, 76). To truly be in a position to institute change, a technology leader in a school district must operate from a position of power. That power does not have to be inherent with an administrative position, but may come from acknowledged expertise and competence or personal trust. Technology leaders in a position of power must have the ability to interpret the formal and informal bases of power within the school community and work with these people to expand the power base of the school improvement team to operate toward change. Little gain from all of the expertise associated with the ten buttons of technology planning and implementation can be made without having support of the "movers and shakers" of the school and community.

One of the main complaints from people involved "in the trenches" of school reform is the availability of time to research and prepare for implementing change. Manipulation of school time tables can increase the power base for transformation. By looking at the system in new ways, many school districts have adjusted the schedules to allow common planning and teaming times giving school personnel an opportunity to be involved in in-service and collaboration on a regular basis. These types of adjustments allow school personnel to increase their power in the change process and increase the probability of creating permanent change.

How do technology leaders acquire the skills needed to instigate and initiate technology learning in school improvement?

School leaders need to model life-long learning and stay informed of learning and technological research and innovation. There is also a need for networking with others who are involved in similar practices of school improvement and technology implementation. There are many resources attainable from the Internet, educational journals, technology and school improvement conferences, university educational staff, and from discussion with others involved in the process. There are more and more individuals involved in implementing emerging technologies into school districts. If those involved will use the communication technologies available, all of these people can be collaborative partners in acquiring information to aid in improvement of our school systems.

If school districts are going to move to a system of curriculum and delivery that will truly prepare students for the world they will face, the people in leadership roles must make the effort to stay informed and continue to increase their abilities to direct planning and implementation in the direction of improved student learning. We must direct our school personnel to the availability of informational and instructional technologies and methods beyond the photocopier full of paper.

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