

Linking Cognitive Science and Technology in the Preparation of School Administrators

Cathy C. Kaufman
Professional Studies in Education
Indiana University of Pennsylvania
USA 15705
CKAUFMAN@GROVE.IUP.EDU

As educational systems grow increasingly diverse and decreasingly centralized, integrating the latest finding in both cognitive science and technology can serve as a motivating force in transforming school leadership. Tomorrow's school administrators must be able to function in conditions of paradox, uncertainty, and discontinuity, where their tasks will be continuously modified by a widening arena of community stakeholders. As their roles are reshaped, effective leaders must redefine their significance within a paradox of both flexibility and control. Traditional examinations of instructional leadership have been grounded in learning formal disciplines, general skills, and specific knowledge. A new synthesis argues that pedagogical approaches in how information is presented is equally as important as content of curriculum [Perkins and Saloman 1989]. The most recent cognitive research indicates that the applied meaning of new synthesis in the classroom means teaching school subjects as high-order thinking, critical processing, and real-world applications. This message is equally important in a first grade classroom or in a graduate level university course. A technology-oriented instructional approach to information accessing and processing parallels this new thinking in the cognitive sciences in a way that few traditional classroom resources can claim. It empowers learners of all ages to process new knowledge in more useful and applicable formats that link formal learning with real world problem solving, and perhaps for the first time since the term individualized learning was coined decades ago, technological approaches to learning present the workable structure to actualize this term.

The use of technology in the classroom is certainly not a new issue. Even vocal members of the opposition in times past are becoming addicted users of the Internet as an increased assortment of software accessories makes information accessing more a learning activity and less an encoding exercise. For teachers and for administrators, a constant factor in the evolution of classroom technology has persistently been a cost/benefit ratio -- how to get the most from the expenditure, how to structure the environment in order to serve the largest number of students, how to match new software to existing curriculum, how to use computers as tools in the business of learning and not just an

alternative electronic drill mechanism, and most importantly, how to insure that technology results in improved student learning. A combination of short-term, poorly planned, inadequately funded projects have resulted in producing a resistant strain of potentially more informed, but more cynical teachers and parents who today demand a shared voice in educational decision-making and who demand school administrators who are themselves open to new learning.

This session shares examples of new learning about technology and school leadership. It examines the direct application of new learning to the real world in the cases of four aspiring school administrators in the Performance-Based Principal's Program I direct at Indiana University of Pennsylvania. Following their first university course, all students develop an Action Plan to address six administrative competencies that can be actualized within the context of their own district. Over a period of 12 to 18 months, candidates must demonstrate mastery in the domains of curriculum, instruction and supervision, evaluation and research, organizational management, human relations, and technology as they work with a university supervisor and an on-site leadership mentor. All work must demonstrate the candidate's leadership rather than participatory role, and it must also contribute to educational reform in the candidate's district. This presentation traces four different situations in which aspiring principals implemented projects that helped them meet the performance requirements for the technology component of the Principal's Program and that produced new thinking about what and how students learn in their communities. Their efforts developed new personal skills, demonstrated their leadership capacity, and effected positive changes within their respective school districts.

The first example integrates the administrative competencies of grant writing, staff development, technological growth, and evaluation research. The candidate's successful grant enabled his school district to expand its automation sufficiently until all classrooms, K-12, could access Internet information through the World Wide Web. Teachers developed new skills and expanded old ones in small workshops and in peer tutoring sessions organized by the candidate. Several town meetings allowed new knowledge to be shared with parents and other community participants in user friendly settings. Early community involvement and building productive ties between businesses and the school was viewed as a way to sustain technological development, in contrast to many educational projects in which the software quickly becomes outdated when initial grant funding ends or when a small group of participants relocates within districts. As teachers who had volunteered for the initial training and their students began to use the Web across the curriculum over the period of a year, a contagious enthusiasm redirected the learning process from a

workshop orientation to peer tutoring in which classroom teachers could learn from others in a less formal, more personal setting in their own classrooms, and at more flexible time intervals. The unique linking capabilities of the World Wide Web motivated this aspiring administrator to become a more intelligent novice and instructional leader as well. As a teacher-researcher, he inquired into the cognitive process of students by tracing the types of paths diverse learners take as they seek information in more self-motivated construction of knowledge and as they present new findings in shared experiences in the classroom.

The rising incidence of school violence motivated a second candidate, at the time of her supervised internship already an acting assistant principal, to use technological access to recent findings in education, social services, and criminal justice in order to find out how other schools across the nation were coping in cases of similar conflict mediation. Because financial constraints in most school districts prevent travel to numerous workshops and seminars, technology affords not only a more effective means of information gathering, but additionally it provides a support structure in being able to communicate regularly with other individuals involved in conflict resolution in the local community and across the nation. This assistant principal knew that busy teachers often discarded the reprints of articles placed in their mailboxes by well-meaning principals. She also recognized teachers' needs for empowering experiences in using the computers for personal growth as well as classroom instruction. She used the Internet access of ERIC documents to regularly draw the attention of her staff to the most current findings regarding schools and communities that were successfully combating similar problems. Her instructional leadership brought a more private sense of mastery in learning something new and benefiting from its application. In this case the involved school began to model a more encompassing cognitive environment in which everyone in the building engaged in learning.

A third example examines challenges faced as we seek to reorganize schools to remove the barriers separating "regular" and "special" education. It demonstrates the passion of one aspiring principal to ensure that special education high school students had the same access to computer technology as their regular education peers. As many of the nation's high schools move toward a Tech-Prep curriculum that links two years of a specialized high school program with two years of university training in order to better prepare students for entry into a technological work place, applied computer classes become an integral factor in this academic merger. The increased need for applied practice is recognized at the same time, in which most school systems are struggling with severe financial constraints. With increased demand on an insufficient number of computers, a difficult question arises. Who needs, or deserves, this technology more? It appeared to the candidate in this case that the mentally challenged special

education students were pushed from rather than toward the computer rooms. He challenged the attitude that special education students did not need computers, or could not benefit from them. And he successfully initiated the regular use of a commercial software program, *A Day in the Life*, to train mentally challenged students for occupational tasks such as painter, rug shampooer, and cashier.

A final example demonstrates again the links between what is taught, what is learned, how students engage in synthesizing data and put it to immediate and observable use. A small rural community questioned how to revitalize a sagging economy and simultaneously boost local pride, developing within children an appreciation of the rich cultural heritage of the area. Visioning exercises for this project presented a unique opportunity for school principals to involve parents and the community in school learning experiences. In this case they provided authentic learning experiences by permitting students to work collaboratively with real world community leaders and professional consultants in investigating their local heritage and in planning future land use development of their local area. The ultimate goal and educational outcome of the visioning exercises was to have the students and teachers assist in developing policies for the local area for future land use in a sound fashion that would insure the protection of both natural and cultural resources.

Local government agencies, business, and private organizations all became active partners in this endeavor. The project presented opportunity for applied problem solving skills in five local municipalities that had little history of working together. Although all communities shared a foundational relationship to the coal industry in the region's industrial past, little shared regard was given to community planning. Industrial zoning on the border of one community, therefore, may share a community border with another township's designated residential areas.

The purpose of the regional committee was bringing the five municipalities together to develop land use and landscaping planning policies. The role of the school district in the regional planning committee was one of permitting students to assist in developing the land use and landscaping planning policies. This was accomplished by having the students participate in a curriculum that examined local heritage, ethnic, culture, places of regional interest, and historic sites. Students used computer simulations, electronic mail communication, and portfolio assessment facilitated by a software program in these endeavors. A cross cultural approach incorporated not only the diversified ethnicity of the region but multi-age joint learning experiences as well. Children incorporated information acquired from their parent and grandparent in projects that were shared between communities. Teachers designed and modified the curriculum and an archeological consultant worked with the communities to give attention to the

human data in addition to the more statistical natural resource data in this learning process.

The role of the school administrator is increasingly being cited as the keystone of educational reform [Gerstner 1994, Sarason 1990, Schlechty 1990, and Wirth 1992]. It is not, however, the authoritative role of times past, but that of a dynamic change agent. It is a position requiring individuals who are flexible and credible and who inspire and respect others as the context of schooling grows increasingly diverse and decreasingly authoritative. It is a position requiring school administrators to re-examine their role as an instructional and technological role model as society rethinks the important business of teaching and learning.

References

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