

change to education because the precepts of social organization that undergird the system still largely derive from 18<sup>th</sup> and 19<sup>th</sup> century economics, technology, and philosophy. *If the educational system were to understand and incorporate state-of-the-art technological practice into its educational practice, then the fundamental shortcomings of the system in light of modern economics, technology, and philosophy can indeed be corrected, and the goal of a truly universal liberal education can be realized.*



### ***Bureaucracy versus the Learning Organization***

Although the word bureaucracy has developed a bad connotation, its denotation is very accurate in describing the function of public education: “A bureaucracy is a component of formal organization in which rules and hierarchical ranking are used to achieve efficiency” (Schaeffer and Lamm, 1995, p. 152). Schaeffer and Lamm provide some key characteristics of bureaucracies: division of labor, hierarchy of authority, written rules and regulations, impersonality, and employment based on technical qualifications (Schaeffer and Lamm, 1995). Katz argues that originally four social structures vied for control of public education (Katz, 1972, p. 5), but the bureaucratic model triumphed and has persisted essentially unchanged since the mid-nineteenth century (Katz, 1972). While the advantages of this form of social organization have produced many wonderful gains in education, not limited to the consistency of materials and philosophy of content and process of education, many drawbacks exist. The specialization and hierarchy of bureaucracy tend to create inadaptable performance. “In any

[bureaucratic] organization, you'll find people who have resisted change so effectively that they have secured their own inviolable turf" (Jellison, 1993, p. 18). That bureaucracies dominate education today is an easily defended assertion. Outright efforts to abandon this form of social organization usually fail, so *an evolutionary approach to change the fundamental nature of the relationship of the individual to the organization is needed.*

The view that we must meet complex challenges with an organizational form that supersedes bureaucracy because of its very superiority has begun to be articulated more fully. *The Fifth Discipline* re-characterizes the successful formal organization as a *learning organization*. Senge does not seek to abandon hierarchy and certified technical proficiency but, rather, seeks to minimize their drawbacks by showing that personal mastery, metacognition, shared vision, team learning, and systems thinking can flatten the organization and make it highly adaptable (Senge, 1990).

### *Technology and Education*

The shortcomings of public education are what sociologist Charles Perrow calls *normal accidents*. He believes that normal accidents are an inevitable natural byproduct of how we organize ourselves technologically in our contemporaneous industrial organizations (Perrow, 1990). If one considers the educational system as a service industry, then the failures of the educational system are normal accidents, and because many industries have used high technology to minimize or eliminate normal accidents, education can do the same.

While people often use *technology* in the narrow sense, (as in the Greek *τέχνη*, "technee," which means art or craft), Pacey asserts that the word *technology* has another, broader meaning. He includes in the definition of technology not only technical aspects but also cultural and organizational aspects, and he labels all three aspects *technology practice* (Pacey, 1996). Therefore, technology practice sums up the psychosocial use of tools. Relevant to the thesis, *to create fundamental reform, education must adopt, not just high-tech stopgap*

*measures, but the whole of technology practice.*

While many have adopted high technology, most have not adopted current technology practice, aside from the use of email. With currently available high technology, we can practice division of labor, hierarchy of authority, written rules and regulations, impersonality, and employment based on technical qualifications **concomitantly** with personal mastery, metacognition, shared vision, team learning, and systems thinking. In other words, *information and communication technology (ICT) is sufficiently developed that it can help any bureaucracy evolve into a learning organization.*

### ***Technology Practices for Contemporary Education***

Here are some examples of how contemporary technology practice can change the fundamental nature of education. ICT allows an individual to play multiple roles, allowing for a greater systemic knowledge of the process and creating a greater sense of investment in the process. *Virtual schooling* reduces input requirements for education,

and educators and students involved with virtual schooling have the ability to give and receive many more certifications of performance competence. When it comes to educating the individual, teachers can follow what the Center for Applied Technology calls *Universal Design for Learning (UDL)* (Pierson, 2006), a conceptual framework for individuating instruction and making possible distinct curricula, paths of learning, and assistive technology to meet the needs of every student to maximizing her or his potential. Also, tools like *content management systems, online computerized assessment, chat sessions, web quests, and video games* are great alterations of the methodology of communication—and consequently of education—if used properly within effective technology practice. Unfortunately, *parents, students, teachers, and administrators tend to have little understanding of these underlying technologies at a level of proficiency necessary to embrace these shifts in technology practice.*

## Conclusion

Fundamental changes to public education have not been made since the inception of the bureaucratic model of education in the mid-nineteenth century. However, universal, individuated instruction is possible with the adoption of state-of-the-art technological practices as embodied by a learning organization. The power of today's ICT to change fundamentally individual and collective productivity and capacity of schooling could allow instruction to meet the needs of students who face complex, rapidly changing problem sets in the future.

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