

This material has been prepared exclusively for the book, Quality and Education: Critical Linkages, published by Eye On Education, Inc., (1992) and is the property of Eye On Education. It is not to be resold or reproduced without permission of the publisher. The publisher can be reached at 50 Clover Street, Larchmont, N.Y., 10538, (914) 833-0551.

The TQM-Technology Critical Connection

By Lewis A. Rhodes
Associate Executive Director,
AASA Arlington, Virginia
and
Clark Kirkpatrick
Executive Director,
TIES Roseville, Minnesota

The Mystery of the Missing Tools

The renowned detective, Sherlock Holmes, used a *different lens*--both literally and figuratively--and in most cases his famous magnifying glass contributed less to his success than the different mental "lens" through which he viewed and made sense of the world around him. Using that perspective, he solved one of his most famous cases by noting the significance of a dog not barking--that is, an event not occurring that should have.

Today, as quality management principles and strategies have begun to be applied in schools, their most significant contribution has been the Holmes-like lens they are providing for making sense of what increasingly makes little sense. Among the most powerful consequences so far have been the questions they have forced us to ask about the ways we assumed schooling takes place.

Now, what if Sherlock Holmes used a *quality lens* to confront and make sense of the mystery of education's missing technologies? What might he ask, as he compared schools to other organizations in America, about what schools do not do with the tools that are available to them.

For example, in general, tools are not used:

- to increase their worker's productivity;
- to add value to their outcomes;
- nor to ensure the equally distributed excellence that is the hallmark of quality results.
- Tools are not part of the *bottom-line* operating infrastructure. Their availability is largely dependent upon gifts and grants. [Can you imagine any business not understanding what tools are fundamental to its work and including them in the core budget as-the-way-they-do-business?]
- Tools are not made available *systemically*--e.g., they may be placed in one classroom or one building in a school district, with results similar to what might be expected were one to distribute wonder drugs randomly throughout a hospital. There are few examples, after

more than thirty years, of appropriate applications when and where needed--and importantly, few opportunities to achieve any sustained effects.

Others who have tried to make sense of this strange anomaly traditionally end up blaming the educator. They imply that somehow educators are different--more fearful of change, not willing to learn how to do a more effective job, and ultimately not really caring enough to want the very best for children. The solution--these sense-makers conclude--is research, information dissemination, and training. Give them more information, prove to them that technology is effective, then teach everyone of them how to use it. It has not worked.

Holmes, on the other hand, as he looked at what had not and was not happening, might ask why these particular professionals would behave that way. They have as much, or more, education than peers in other public and private sector institutions; they are driven by a commitment to children that helps them endure conditions that would not be tolerated by other professionals; and many of them are technologically-literate outside the workplace. Why, he might ask as part of his sense making, wouldn't they welcome, if not seek out, ways to increase their impact on the children whose lives they touch?

Why indeed? Something doesn't make sense. If the educator isn't the problem, then

- Why aren't technologies used for more productive work?
- Why aren't they applied systemically?
- Why aren't educators demanding these tools?

Like Holmes, in this chapter we will look for the answers, not in the technology, but in the system. And in particular, in what the quality management lens is helping us learn about the nature of the work of schools, the system that supports it, and the needs of the practicing educator.

Through this lens we will see that American public education, information technology, and quality management are inextricably linked as partners in a learning venture upon which the future of America's schools, if not its society, will depend.

The Work Defines the Tool

The quality management principle that over 90% of any work problem lies in the system and not the workers comes up against a peculiar situation in education. What system?

It has become practically a cliché to talk about *systemic* change in education; yet there is no common understanding of just what that system is. Both non-educators and educators seem to have problems defining "the" system-- and will spend hours validating their views of schooling as a political, or economic, or hierarchical system. With no common vision of the system to be improved, some even question whether or not there *is* a system.

While each may be correct within their perspective, they all miss the very important clue in what Deming provided the Japanese in his original "production as a system" flow chart. That is, we are looking for the system of work. The work of the people in the system --both adults and children -- is the only thing that is manageable and is the primary arena to which technology can add value.

Understanding that work, therefore, becomes the prerequisite knowledge for any effort to improve it; as well as for any effort to add value to it technologically.

Ask most people what the work of schools is, and the answer generally will denote some form of delivery or transmission process -- "*communicate* culture, *disseminate* knowledge, *transmit*

information, etc." Yet the job of schools is no more the "delivery of information" than the job of hospitals is the delivery of medicine. True, medicine is "delivered" in hospitals, but only through a managed work process that tries to match it appropriately to need.

The work of hospitals, therefore, takes place in a setting structured and managed *to deliver appropriate service based upon continuing individual diagnosis*. Most educators believe that is the nature of their work, also. But they attempt to accomplish that work in a setting that structured and managed around the concept of delivery. With this basic misunderstanding, is it any wonder that until now technologies have been seen as adding little value to the work of schooling, only cost. Productivity gain is impossible without understanding the work one is trying to make more productive.

Until recently, there has been little reason to question these fundamental assumptions about the nature of educators core work because we lacked ways to provide comprehensive, total organizational x-rays of school work processes. We could only take snapshots of its various component roles--here's what teachers do, or administrators, or curriculum developers, etc. In a supposedly loosely-coupled organization of isolated practitioners, it has been practically impossible to envision how it all fit together.

Today however, quality management tools and processes provide organizational "x-rays" that allow us to view the nature of educators' actual work processes and to hold them up against what is known about the nature of work that produces quality results.

Quality-Producing Work

All world-class organizations are structured and managed around the same simple, common sense process regardless of whether they provide services or products. The process consists of two elements:

- a core work process involving those who "touch," or interact with, the product during its development; and
- an organization in which every function supports the response-ability of the core work.

The core work process itself is by nature a *response* process driven by needs and requirements of the client, customer, or product. The work, then, consists of continuing informed interaction between caring workers and the "outcome." Each cycle of interaction brings the outcome closer to the level of quality desired.

By nature, this quality producing work process is highly information dependent. Responses require continuing feedback that serves as the basis for determining the next act; and continuing exchange with the other organizational functions necessary to inform and support the interaction. In world class organizations, much of technology's value comes from the information it provides for this process. The work defines the tool.

It should not be difficult to see the parallels between this quality-producing work process and work of educators whose actions have produced quality results in form of growth and learning in others. Good teachers have always managed learning that way. And now, more importantly, cognitive research reveals that effective human learning requires just such a process. Each learner constructs personal meaning from these continuing interactions with the surrounding world.

Operating without this holistic perspective until now, it is obvious why technology has not become part of the ways schools do their business. Providing the connections, access, and new forms of information that make possible a continuing process of informed interaction are the very value-

adding dimensions that, as in industry, can justify the cost of a district-wide information technology infra-structure.

One part of the missing technology mystery is clear. Over the years, technology's results and potentials have been clearly demonstrated, but seldom in ways that could be integrated into the ways the people within the system perform their daily tasks as part, or in support, of the core work process.

The System Connects the Work

School practitioners increasingly claim "everything-seems-connected-to-everything-else;" that their work settings are made up of parts that, intentionally or unintentionally, influence one another as they strive to impact the lives of children -- their common organizational purpose. Unfortunately, most people do not directly perceive those seemingly ubiquitous influences on their work as a system. In education, recognizing that one is being impacted by a system-- and understanding and perceiving that system -- have been, until now, two wholly different issues.

The connections between the core teaching-learning interaction and the support functions of everyone else in the school system should become the blueprint for a school system structure that frames, aligns, and focuses on the common purpose of their work. Actually, for most outside the classroom, support of the core work is their *intention*. But accustomed roles and relationships developed around the misperception of the work process seldom allow fulfillment of these intentions. These deeply-set roles and relationships make up today's prevailing school structure -- the target of the "restructuring" movement.

Today quality management provides us with a capability to view, understand, and then manage the actual interrelationships and interdependencies in a school district. Schools are learning that quality management processes can help them understand the fundamental nature and connectedness of their work as a system. They are discovering that:

- the manageable nature of their *system* lies in the white spaces between the boxes on the organization chart;
- determining how to bridge those spaces with *functional relationships* is a primary role of organizational leadership;
- "relationships" between and among functions in a work system are largely defined and maintained by the exchange of *information* -- who gives it, gets it, how its generated, and what types of decisions or choices it feeds; and that
- the fundamental challenge to transforming organizations is the ability *to link work processes together* in order to create and maintain a system.

As school personnel throughout a district engage in internal "customer-supplier" analyses, they begin to see their work in a flow of time and discover the already-present influences on each other's work. Using this type of total system x-ray, it is fairly easy to see the critical points where information technology could provide immediate value. These are the "disconnects"-- the missing linkages separating dedicated professionals with something to contribute to each other's effectiveness. Also, we can see the points where critical information must be accessible as it is needed, and where new information must be generated from daily experience.

The Workplace of the Mind

Understanding school's core work and how to systemically support it will still leave our technology mystery unsolved. With a quality lens, we must look in greater depth at just what is being connected; the nature of what flows through those connections; and the cultural barriers that presently clog the open use of those connections.

As world class organizations have analyzed and prioritized their critical resources, a fundamental, and new, understanding has emerged. The workplace is no longer a physical space:

"As a leader, your most precious possession is the people you have . . . and what they carry around in their heads." -- Robert Reich

"Today, as never before, the limit to innovation in business is not technology, but the managerial mindset." -- Richard Howard

". . . 95% of American businesses are . . . stuck in a model that assumes that brains are needed at the top to manage, by remote control, the production line. And along that line, workers perform very limited, fragmented actions which render their thinking irrelevant. But earth has shifted its industrial axis. To compete globally, business needs to organize itself anew on a completely different basis: a belief in and the use of the brainpower of front-line workers." -- Ira Magaziner

and *Shoshana Zuboff* notes, as she studies modern workplaces, that workers today must be learners, and managers must be teachers -- that is, they must create environments where workers can learn from their work.

These ideas may not be unfamiliar to educational reformers advocating *site-based management* or *student-as-worker*, but the concept has yet to be accepted as a fundamental belief. The sine qua non of a quality work process is the understanding that the real core work process takes place in the workplace of the mind. Human beings are cognitive workers who, as they interact with their surroundings, continually process information to make sense of the world around them and their place in it; who integrate this information with what they have known before; and whose learnings represent the new information resulting from that integration.

Thus there is no difference between the work of teachers and administrators in the school. Each must manage environments where others can learn and grow from their work; and ultimately no difference between the work of adults and the children who must become self-managers of their own growth.

Because we are unaccustomed to looking at schools in this way, it may be hard to recognize the forms of already available information that feed this basic human process. For example:

<u>Need</u>	<u>Types of Information</u>
• to <u>orient</u> oneself, gain personal <u>meaning</u> , and understand how one personally "fits" or relates to the organization's purposes.	<i>Through vision, mission, goals, values</i>
• to know the <u>effects of one's own actions</u> in order to <u>self-correct</u> .	<i>Through coaching, access to formative feedback, and opportunities to reflect</i>
• to know what behaviors are <u>expected</u> , <u>ideal</u> , <u>successful</u> .	<i>from models, rewards, punishments</i>

- to realize what can be done.

Through opportunities for experience sharing with peers and access to research

- to continually develop an understanding of the conditions and situations to which one responds.

Through opportunities to analyze scanning data, trend analyses, and student data.

"Barriers" in the Workplace

With a common understanding of the mind as workplace--and perceiving information as the *nutrient* for growth, we now must recognize some other "information" already lying around that work area: negative attitudes and perceptions formed from the ways information has been used in the past.

- From childhood on, data about one's actions are used to judge and blame, seldom for awareness and support. The continuum spreads from test scores and grades to politicians selectively taking numbers out of context to justify or blame.
- "Forms" are burdens; representing information to be collected for someone else's learning.
- "Reports" are information provided too late to be acted on.
- Even the concept of an information system is perceived as something that is separately managed, and which exists for those at the "top."

Fear and lack of trust run so deep in organizational settings such as schools, that the development of trust and the development of system-wide open exchange of information become intertwined issues in the effective management of schools as systems.

This is an area where quality management processes and tools are making major contributions. School staffs, working in groups apart from their traditional roles, find that trust emerges as a consequence of common problem-solving experiences. Recognition of common purposes develops a base of mutual understanding on which future actions can be constructed.

Most significantly, identification and prioritization of schools' core and support processes, with the critical success factors vital to each, is beginning to fill in the vision of what an information system to support *response-ability* must look like.

For example, consider how this exercise might identify the critical success factors in the core work process which could serve as a base for an information system that has the classroom, rather than the board room, as its core client

Ask Teachers:

- 1-What do you need to know in order to be a little bit more effective tomorrow?
- 2-Where is that data, information, or knowledge? Is it internal or external?
- 3-How do you presently think you can get it?

Ask Principals:

- 1-What do you need to know in order to be a little bit more effective tomorrow?
- 2-Where is that data, information, or knowledge? Is it internal or external?
- 3-How do you presently think you can get it?
- 4-To what extent is the data or information you need in the information the teachers require first for their own use?
- 5-To what extent do you have data or information needed by the teacher?

Ask Central Office:

- 1-What do you need to know in order to be a little bit more effective tomorrow?
- 2-Where is that data, information, or knowledge? Is it internal or external?
- 3-How do you presently think you can get it?
- 4-To what extent is the data or information you need in the information the teachers and/or principals require first for their own use?
- 5-To what extent do you have, or have access to, the data or information needed by the building staffs?
- 6-What do you need from the external environment in order for the system to continue to exist and grow?

The Connected Listening and Learning Organization

The nature of modern life requires that organizations be able to listen, learn, and respond holistically. To do this, a school system must provide an environment where people can trust the information they get. This means not only that they must trust each other enough to give open and honest information, but they must understand how everything "fits." They must have a vision that encompasses everyone's relationship to a common purpose, and the nature of what each person needs to know to be increasingly effective.

Policymakers believe they are addressing the major information needs of school reform when they focus on "standards" and "assessment." One provides indicators for direction, and the other indicators of where one is. But until now they have had no process for connecting them. As we have seen, because of a fundamental misunderstanding of the school's work process, there is no information-driven process (comparable to what might be found in the modern hospital) that would allow continuing generation and analysis of "assessment" information to support daily diagnostic decisions, and to ensure their alignment with overall directions.

Now, the quality management movement is providing paradigm-shifting experiences that have uncovered new ways of looking at work in organizations. One "discovery:" a results-driven management process requires a fundamentally different kind of information support. Required is a technology-supported *information infrastructure* that goes beyond data, and traditional concepts of management information systems.

A system to support such response-ability would:

1. **Provide continually updated background information about the conditions to which schools respond.** For example, teachers would have daily, up-to-date data about each student that would include not only quiz and test results, but information about learning styles, personal strengths, etc. Parents and students, as the other two decision makers who most influence learning, could access and use their own data.
2. **Support self-correction.** Provide quick turn-around of information generated by student acts while something still can be done to take advantage of any unanticipated results, or to remedy any problems uncovered.
3. **Provide analytic assistance at the classroom and school level.** Because teachers and principals have worked in such relative isolation, their analytic skills frequently have withered from lack of use. Software that supports local analysis can be an important tool. Technology can add value in analysis and understanding to ensure that "data" turns into institutionalized knowledge as the organization "learns."
4. **Provide access regardless of setting.** In particular, information must be accessible at the professional's workspace -- the home. One characteristic of professionals is that an important part

of their work is done at times when they are not in direct contact with their clients. They reflect, research, strategize, and plan at times and in places where they will not be distracted. For teachers and administrators, this is most often at home.

5. Aggregate and analyze information at the building level. Districts can provide scanning information, disaggregated data, and research that will support, and inform, the principal's role as instructional leader.

6. Support, and increase the frequency of, organizational interactions. These mostly informal exchanges serve to align and connect isolated actions of individuals and work groups as they fulfill the school system's aims.

7. Provide access to others' experiences through electronic "quality circles." The problems faced by today's teachers and schools differ so much from the past that learning from each other's experience has become a fundamental requirement for effective schooling. Electronic-conferencing can allow meaningful exchanges of experience and expertise that operationalizes interdependent roles.

Case Solved

As he completed his investigation of the missing technologies, Holmes might have turned to his associate and concluded: "*It's elementary, my dear Watson! . . . It wasn't the technology that was missing from the picture . . . it was the people!*" When you look at schools as work settings, you'll see that in schools they ask, '*What can technology do?*' In other work settings, they ask, '*What can people do . . . with the technology.*'"

Holmes is right. But now educators, too, can ask that same question, and develop their own answers. The tools and processes of quality management -- and the availability of information technologies -- can allow educational leaders concerned with quality school outcomes to develop the understanding, experience, and the technology applications to connect personal and organizational productivity. The development of such a technology-facilitated quality support system can be the result of a new form of development process -- *in-the-job learning*.

Enabled by information technology, this process can

- simultaneously develop trust,
- overcome a culture of information anxiety, and
- provide opportunities to learn how to apply unfamiliar technologies to daily work as part of that work.

Policymakers and practitioners, alike, can be empowered to:

- crack walls of professional isolation with networks of mutual support;
- provide access to information and other resources at the places and times needed for timely responses;
- establish and maintain new organizational relationships through supportive information flow; and thereby
- contribute to what *schools can achieve* -- and at the same time, to what *educators can do, and be!*

(Sidebar)

"The total quality effective school is probably unattainable (or even approachable) without a major commitment to the use of computers and other related information-processing technologies. The technology tool is critical if the quality school is going to be able to engage in the self-monitoring and adjustment processes that are a part of a dynamic and responsive organization. The first tools of technology being recommended should focus on how the adults in the school can develop and maintain information (a data base) around each common place for each student, teacher, essential learning domain and classroom setting. Such information systems are essential if school leaders are going to be able to monitor the instructional system and make appropriate adjustments in a timely fashion. Most schools have only begun to realize the power of the computer as a tool of instructional delivery. Even fewer schools have recognized its potential as a management tool."

Lawrence W. Lezotte -- The Total Quality Effective School