Transformative IT = Process-Supportive IT

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In the mid-1980s I worked for a few years in the healthcare manufacturing industry (large-volume parenteral solutions, drug delivery systems). Our company was one of the first organizations in southern California to embrace the concepts of W. Edwards Deming,1 and in the process we transformed our company. A couple of the components of Deming’s 14 points are what is now branded as Six Sigma (see sidebar, page 31).

As we embraced all of Deming’s concepts within the company, we also extended them out to our "partners" with which we contracted (usually small companies). We included them in our training, shared our technology, and helped them develop standards and processes that improved their ability to provide us higher and higher quality medical products.

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One group of partners for which I managed contracts and relationships was medical plastic injection molders. These partners didn’t make trash can lids. They molded FDA-certified resin into small, highly complex, engineer-designed components for medical devices.

Plastic injection molding started out as an art. Originally a machine had a few dials that an engineer or technician turned now and then based on a few measurements from a random sampling of parts along with a lot of guessing about the outcome of turning a knob. The hope was that it would improve what was going on in the black box.

This unsophisticated approach to making plastic parts was OK for awhile. But customer standards and expectations for more consistent quality, reduced waste, and tighter and tighter tolerances demanded that injection molding machines change dramatically. Within just a couple of years, manufacturers of injection molding machines built them with technology that gave an operator transparency as to what was going on in the big metal box.

Critical measurements were taken all along the pathway from raw resin to finished component: Temperature of the tube where the resin enters, temperature of the resin in the tube, temperature of the resin at the point of injection into the mold, temperature of the mold upon injection and upon release, pressure exerted to inject the melted resin into the mold, pressure of the mold halves pressed against each other, time the mold stayed closed, time the mold stayed open, speed at which the mold opened, temperature of the water cooling the mold, etc.

All of these measurements were...
available for real-time monitoring, not monthly reports. Statistical process control charts printed out of the machine as it was running, monitoring the desired key indicators. The machine also monitored itself and indicators warned an operator if critical measurements showed deviation from designed process, signaling a change in settings needed to be made. In the most sophisticated clean-room environments, each machine could be monitored and controlled from a command center. This kind of information technology incorporated into a designed injection molding process was truly transformative.

**Transformative IT**

Transformative IT is IT designed to support people and process rather than to replace people. It is IT designed to make everyone in the process more effective. It is IT designed to focus people on where they can add the most value. It is IT designed to give people information they need, when and where they need it. It is IT that was available in other industries over 20 years ago.

That is the kind of leap forward and upward that information technology must provide to health care:

1. It must provide transparency. That is, the software must be visible from every computer in the medical office or hospital, and even between the two. The information selected for visibility should create the possibility of preplanning, with the desired result being flawless handoffs and interlocking accountability.

2. It must provide real-time monitoring. Key performance indicators must be measured, monitored, and real-time. Signals must blare when action should be taken so everyone knows that minutes matter.

3. It must be developed with new, world-class-designed processes in mind. The computerization of dysfunctional processes is a hindrance, not a help, to achieving the highest quality health care.

4. Its primary purpose must be to give frontline workers the information they need to make good, timely decisions for the patient.

5. It must be oriented towards operations. Because most healthcare software has been written without key operations indicators in mind, what little data is now collected is buried in a database unavailable to a needy user.

6. It must be designed to enable not just the department, but the entire medical group and/or hospital to function as a single healthcare provider.

**W. Edward Deming’s 14 Points**

Deming offered 14 key management principles for transforming business effectiveness.

1. Create constancy of purpose toward improvement of product and service, with the aim to become competitive and to stay in business, and to provide jobs.

2. Adopt the new philosophy. We are in a new economic age. Western management must awaken to the challenge, must learn their responsibilities, and take on leadership for change.

3. Cease dependence on inspection to achieve quality. Eliminate the need for inspection on a mass basis by building quality into the product in the first place.

4. End the practice of awarding business on the basis of price tag. Instead, minimize total cost. Move toward a single supplier for any one item, on a long-term relationship of loyalty and trust.

5. Improve constantly and forever the system of production and service, to improve quality and productivity, and thus constantly decrease costs.

6. Institute training on the job.

7. Institute leadership. The aim of supervision should be to help people and machines and gadgets to do a better job. Supervision of management is in need of overhaul as well as supervision of production workers.

8. Drive out fear, so that everyone may work effectively for the company.

9. Break down barriers between departments. People in research, design, sales, and production must work as a team, to foresee problems of production and in use that may be encountered with the product or service.

10. Eliminate slogans, exhortations, and targets for the workforce asking for zero defects and new levels of productivity. Such exhortations only create adversarial relationships, as the bulk of the causes of low quality and low productivity belong to the system and thus lie beyond the power of the workforce.

11. (A) Eliminate work standards (quotas) on the factory floor. Substitute leadership. (B) Eliminate management by objective. Eliminate management by numbers, numerical goals. Substitute leadership.

12. (A) Remove barriers that rob the hourly worker of his right to joy of workmanship. The responsibility of supervisors must be changed from sheer numbers to quality. (B) Remove barriers that rob people in management and in engineering of their right to joy of workmanship. This means abolishment of the annual merit rating and of management by objective.

13. Institute a vigorous program of education and self-improvement.

14. Put everybody in the company to work to accomplish the transformation. The transformation is everybody’s job.

Transformative IT in Practice

At the World Health Care Congress in April 2007, nationally recognized physician Brent James, M.D., M.Stat., vice president for medical research at Intermountain Healthcare (IHC) and executive director of its Institute for Health Care Delivery Research, spoke as a panel member of the keynote session on “Transformative IT.” He indicated that IHC was one of the first healthcare organizations to create and actively use an electronic medical record (EMR) in the 1970s. It was time to get a new one, so IHC initiated an intense (40 people for 9 months) evaluation of existing commercial EMRs. Their past successful experience demonstrated that above all else, the primary purpose of the EMR had to be to support care process models. After a thorough vetting, IHC discovered the current commercial EMR offerings did not have the infrastructure to meet that primary purpose—which creates the world-class clinical monitoring, clinical improvement, high-quality health outcomes, and tens of millions of dollars in savings for which IHC is known. They decided to build their own once again.

Sacred Heart Medical Center (SHMC) in Spokane, Washington also has been a leader in the implementation of information technology. However, they found that simply replacing paper systems for commercial computerized systems gave them little advantage either financially or clinically. Longtime advocates of technology, the visionary leaders of SHMC ventured out to create their own information technology that provided: (1) transparency hospital-wide even out to physician offices; (2) real-time monitoring of key performance indicators available to the frontline workers as well as the executives; (3) detailed dashboards of key performance indicators including prioritization of next effort; and (4) support of newly designed operations processes.

The result for SHMC has been such high-quality service that their emergency department volumes have increased 30 percent, while wait times have plummeted. Inpatient admissions by insured patients have climbed. On-time starts in the operating room have skyrocketed and drawn more surgeons and surgical cases to the hospital. Net revenues have risen by tens of millions of dollars. They also discovered that IT supportive of operations processes positively impacted their core measure quality indicators, qualifying them for a top CMS award. They continue to pursue new, innovative technology supporting designed processes.

Supporting Care Process and Operations Process Models

Both IHC and SHMC have been on the “The 100 Most Wired Hospitals and Health Systems” list for several years. But they have discovered that for IT to be transformative it must do more than create electronic versions of existing dysfunctional processes. In tune with their experience, Peter Orszag, director of the nonpartisan Congressional Budget Office, recently reported that the CBO’s analysis found that “the use of electronic medical records, short of any major change in how providers deliver care, would have a muted effect on lowering overall healthcare costs” (italics added).4 IT must support newly designed care process models and newly designed operations process models. Only then can IT transform health care by increasing quality, reducing cost, and increasing revenue.

Discovering and designing both the clinical and operational processes is a significant challenge due to the complexity of the healthcare system. Fortunately, there are healthcare organization leaders—such as SHMC and IHC—that have done much of this hard work, going well beyond just an implementation of a commercial IT system. They have identified the process models that technology must support and can demonstrate the grand possibilities if followed.

References

1. For more information on the work of W. Edwards Deming, visit the W. Edwards Deming Institute at www.deming.org.
2. The 4th Annual World Health Care Congress was held April 22-24, 2007 at the Washington Convention Center, Washington, D.C. Dr. James spoke at a Keynote Session entitled “Transformative IT” on April 24. For more details, visit www.worldcongress.com/events/nw700/highlights.
3. Hospitals & Health Networks publishes an annual Most Wired Survey and Benchmarking Study that asks hospitals to report on their use of IT in five key areas: business processes, customer service, safety and quality, workforce, and public health and safety. For more information, visit hhnmag.com.

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