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# Will Bugs Eat Up the U.S. Lead in Software? (int'l edition)

If U.S. software companies don't get with it in terms of quality, they could kiss big chunks of business good-bye. Both India and Brazil are mounting intensive campaigns to nurture a world-class software industry. Their competitive advantage will be quality--the virtual extermination of software bugs that infest most U.S.-made packaged software. And their mentors in this quest will be U.S. quality gurus whose voices, mysteriously, are still not widely heeded in America.

Already, of the world's 12 software houses that have earned the highest rating from the Software Engineering Institute (SEI) at Carnegie Mellon University, seven are in India. That's largely because Indian programmers are snapping up new methodologies shunned by America's cowboy programmers.

The software scene today is uncomfortably familiar to anyone who followed earlier crises in hardware manufacturing. For decades, quality gurus W. Edwards Deming and J.M. Juran had urged manufacturers to change. The message was: Design in quality at the beginning of the development process, instead of "testing in" pseudo-quality at the end of the production line.

**NOT CHEAP.** The quality call to arms mainly fell on deaf ears in the U.S.--but not in Japan. By the 1970s and '80s, Japan was grabbing market share with better, cheaper products. They used Deming's and Juran's ideas to slash the cost of good quality to as little as 5% of total production costs. In U.S. factories back then, the cost of quality was 10 times as high: 50%. In software, it still is.

Watts S. Humphrey knows about the high cost of "testing in" quality. Now 72, he spent 27 years at IBM heading up software production and then quality assurance. "We had two acres of computers just running tests," he recalls, cringing at the thought of all that nonproductive cost. After retiring from IBM in 1986, Humphrey joined the then-fledgling SEI as a fellow. He has since emerged as the Deming of software.

In 1987, he unveiled a system for assessing and improving software quality. Called the capability maturity model (CMM), it has proved its value time and again. For example, in 1990 the cost of quality at Raytheon Electronics Systems was almost 60% of total software-production costs. It fell to 15% in 1996, thanks to CMM, and has since dipped below 10%.



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**HUMDRUM.** Humphrey has devised two new tools for individual programmers and software teams. They include guidelines for such things as rigorous time management and compiling records of the lessons learned from each project.

That may sound humdrum, but the software tools deliver results. The first user was Advanced Information Services Corp. (AIS), a small contract-software house in Chennai, India, and Peoria, Ill. When managers adopted Humphrey's new process methods in 1996, profits doubled, and defects nosedived 98%, to a mere 0.05 bugs per 1,000 lines of code.

Like Deming and Juran, Humphrey seems to be winning more plaudits overseas than at home. The Indian government and several companies, including AIS, have just founded the Watts Humphrey Software Quality Institute at the Software Technology Park in Chennai. In hardware, U.S. manufacturers eventually grasped the quality imperative and rejoined the ranks of the world's most admired manufacturers. Let's hope U.S. software makers don't procrastinate over quality as long as their hardware cousins did.

*By Otis Port in New York*

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