What can software managers do to improve software productivity? There are lots of answers to that question. But Dr. Barry W. Boehm of TRW has come up with a new one. He calls it “Theory W Software Management.”

Why Theory W? Well, there’s already a Theory X, a Theory Y, and a Theory Z (see accompanying box on next page). Why not a Theory W to continue the alphabetic progression?!

What does the W in Theory W mean? It stands for “make everyone a Winner.” That is, do everything you can to make all the players in a software project—the managers, the customers, the users, the developers, and the maintainers—have a “win” in the resulting product. By a “win” Boehm means that each player has achieved most or all of his goals for and about the project.

Boehm, a chief scientist with TRW Defense Systems Group, presented his Theory W ideas for the first time as the first Distinguished Lecturer in a new series of lectures at the Software Engineering Institute in Pittsburgh, December 2, 1987.

Boehm described the steps toward achieving Theory W as:

1. Establish a set of win-win preconditions. Understand what the win conditions for each player really are. Establish objectives that include making those wins possible. Provide a supportive environment in which all participants accept the possibility of a win-win solution.

2. Structure a win-win software process. Establish a realistic process plan, including the flagging of win-lose and lose-lose situations as risks. Provide feedback that keeps the players involved as negotiation and compromise proceed.

3. Structure a win-win software product. Define a final software product that matches all the win conditions, particularly those of the user and the maintainer.

Typical win conditions for the various players in a software project are:
- Management wants the product built with no overruns and no surprises.
- Customers want the product built as quickly as possible within budget.
- Users want lots of functions, a fast and robust product, and user-friendliness.
- Developers want an interesting career path, a product built with integrity, and the minimization of documentation writing.
- Maintainers want a bug-free product, good documentation, and a product that is easy to change.

It is not always easy to meet all of these sometimes-conflicting goals. And in addition to that, each of the players as an individual probably has goals that will help identify what a “win” is to him. A win-win solution, Boehm pointed out, must be negotiated in both functional terms (the list above), and personal terms.
The opposites of a win-win product, Boehm said, include quick, cheap, and sloppy products, which result in a "win" for the developer and the customer, but a "lose" for the user; a product with lots of bells and whistles, which results in a "win" for the developer and user, but a "lose" for the customer; or a product resulting from driving a hard bargain, where the "win" is for the customer and user, but the developers lose. Boehm pointed out that in these situations no one really wins.

The Theory W approach, as can be seen from the diverse and conflicting goals above, is harder to apply than it might at first appear. Boehm pointed out that data processing professionals, whose social needs relative to growth needs are far lower than most other professionals, find it hard to seek solutions in people terms. Boehm recommended a four-step approach to solving this problem:

1. Separate the people from the problem.
2. Focus on interests; not positions.
3. Invent options for mutual gain.
4. Insist on using objective criteria to analyze the results.

There are several criteria that must be met if a software management theory is to be effective, Boehm said. It must be simple, it must be general, and it must be specific.

Simplicity means that the theory can be expressed concisely, and yet detailed guidelines can be derived from the basic concept. Theory W, Boehm says, satisfies the goal since it is expressed in four words and three steps.

Generality means that the theory must apply to all classes of products. Theory W has no application domain dependencies.

Specificity means that the theory can be applied directly to a particular project; with a clear-cut method of approach, and with criteria for testing the result. Boehm has applied the theory in several specific projects.

Any software management theory must also provide a basis for the framework of management activities. Boehm cited the Kootz-O'Donnell management framework, which contains five processes—planning, organizing, staffing, directing, and controlling. Boehm pointed out that Theory W can be useful in each of these activities.

The Distinguished Lecture program at the Software Engineering Institute is established as a forum to communicate new software concepts. Speakers chosen are leaders in the software community. The lectures themselves are to contain material not previously presented elsewhere. Lecturers in 1988 include: Dr. Jon Bentley, AT&T Bell Laboratories, January 27; Dr. William Riddle, Software Productivity Consortium, February 17; Dr. Harlan Mills, Information Systems Institute, March 16; Dr. Roger Bate, Texas Instruments, May 16; and Dr. Victor Vyssotsky, Digital Equipment Corp., June 8.

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