

If You Get Straight A's, You Must Be Intelligent

Respecting the Intent of the Capability Maturity Model

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Too often, organizations get caught up in the game of trying to achieve a particular Capability Maturity Model (CMM) rating and do not respect either the intent of the CMM or the positive aspects of a well-planned process improvement program. This article discusses the drawbacks of such a process improvement approach.

Like associating grades with intelligence, too many organizations automatically equate the Capability Maturity Model (CMM) level of an organization with its ability to produce high-quality software. As those involved in software process improvement can attest, this assumption is often far from true. In reality, organizations considered immature can and do produce high-quality software just as mature organizations can and do produce low-quality software. Organizational maturity is no guarantee of success; it merely increases the likelihood of success.

Before the feathers of software quality assurance get too ruffled, let me define my view of quality software. From a project manager's perspective, quality software meets or exceeds all user requirements, is developed within both cost and schedule, and is built to be effectively maintained. I am familiar with projects that have been praised by their customer and user community, have satisfied my definition of software quality, and continue to struggle to achieve CMM Level 2. If we merely assume that a low CMM rating equals low-quality software and that a high CMM rating equals high-quality software, the aforementioned organization's software would be suspect regardless of user or customer satisfaction. Is it better to modify software development processes merely to satisfy various CMM key process areas (KPAs) rather than to improve the software development process? That would be comparable to a student who is more interested in getting a good grade than in acquiring knowledge.

What Is the Problem?

The problem is that the intent of the CMM has been lost in the implementation. The CMM was designed to help organizations improve their software development capabilities and was not intended as some type of awards program or measuring stick. The more process improvement programs (PIPs) in which I participate, the more I am convinced that this misuse of the CMM is more about selling a capability than improving a capability. As long as an organization's Software Capability Evaluation (SCE) rating is good, the process used to acquire the rating is validated. For the same reason, the processes created as part of the PIP are assumed to be valid as well.

Why Is This a Problem?

Is this shift in an organization's process improvement focus a serious problem? Emphatically, yes! A software PIP does not come without a cost. From a software engineering viewpoint, the cost of a well-managed PIP has a justifiable return on investment (ROI) if the PIP increases the quality of the software product being produced. Conversely, if the goal of the PIP is merely to achieve a good SCE rating, the cost of the program is unnecessary overhead and will detract from the overall quality of the software.

Indicators That the SCE Rating Is Valid

From participation in various software process improvement activities, I have identified several issues (explained in the following sections) that can and do influence the validity of the SCE rating.

Workers are highly sensitive to perturbations that directly affect their work environment. Therefore, a PIP must be a planned activity that involves the entire organization. PIP leaders and the rest of the organization can only bring about effective process improvement through open communication and diligent training. Otherwise, both apathy and cynicism will create an environment in which a positive ROI can never be realized.

I sincerely believe in the merits of the CMM and believe that there are definite benefits to a well-managed PIP. Furthermore, when software personnel are introduced to the CMM, the merits of the model become self evident.

The bottom line is that many PIP activities succeed or fail based on the level of buy-in from the people involved. It also is important to remember that process improvement is a journey, not a destination.

Proper Staffing of Process Improvement Teams

A well-staffed process improvement team is vital to initiate change within an organization. A successful process improvement team guides, trains, and assists each project within the organization and tracks the overall organizational improvement. Conversely, a process improvement team that lacks the authority to implement changes and is not staffed with the best individuals the organization has to offer is doomed to fail.

Another pitfall to avoid is to staff a process improvement team with senior personnel who mandate change rather than stimulate cooperative change from

the bottom up. Additionally, a good process improvement team should not operate outside the mainstream projects directly affected by the PIP. Care should be taken that the process improvement teams are not divorced from the intimate problems and concerns of the project. A well-managed process improvement team should garner complete, genuine, and uncoerced support and buy-in from each project affected.

Processes-Based Project or Organizational Value

Creating and documenting processes based strictly on satisfying KPA requirements can negatively impact PIP activities. When project personnel are tasked to do activities with little or no visible worth, it detracts from the overall organizational value and productivity. If a KPA for a project is identified as non-compliant, the worth of the KPA should be discussed with the project personnel and a cost-effective solution to satisfy the area should be derived. However, to merely develop and document processes without regard to process improvement or software products is also a waste of time and resources.

Quantify the ROI of Process Improvement

There is overwhelming evidence that CMM compliance has an associated positive ROI. However, the ROI will vary based on a multitude of factors unique to each organization. An organization working toward CMM compliance should attempt to quantify what its ROI should be. In essence, the ROI becomes the fundamental reason for CMM implementation. An ROI will provide the project information that shows how process improvement saves the organization time, money, and resources. Project managers need to know the ROI prior to committing resources to further PIP activities.

Use External Experts for the Right Reasons

External experts can be a valuable resource in a well-managed PIP; however, they should be brought in to aid process improvement rather than to deter-

mine how to circumvent a deficient KPA. In addition, external experts should not coach project members in CMM evaluator responses. This is a detriment to genuine process improvement and can quickly create cynicism within a project.

Define Process Improvement in Statement of Work

Rather than merely define an arbitrary CMM level, the government must precisely define what they expect to see as part of a contract organization's software development process. To define a CMM level as a goal can still be done but the definition should detail specific expectations. Therefore, the focus is on mature software processes without regard to a previous or future CMM level. In addition, the government customer is provided the opportunity to show that they are intimate with the CMM and its KPAs. Detailed process improvement requirements can also be used to determine the relative ROI when the statement of work paragraphs are rated during contract performance periods. In this way, the government can give credit for improvement even though the specific CMM goal has not yet been achieved.

Conclusion

Fundamentally, if an organization does not believe in the merits of process improvement, the PIP activities become self defeating. This further erodes confidence in PIP activities, and may culminate in complete dismissal of further attempts to improve the organization's business practices. ♦

About the Author

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Systems Engineering Capability Maturity Model

The Software Technology Support Center now offers information services in a new area: the Systems Engineering Capability Maturity Model (SE-CMM). Visit our Web page for quick access to some general data, or contact Randy Wright for more details. Also, we will soon offer fee-for-service briefings, training, and assessments as well as follow-on consulting services.

The SE-CMM describes the essential elements of an organization's processes that must exist to ensure good systems engineering. Reports indicate returns on investment similar to those for implementing the Software CMM. Several companies and government agencies have embraced this concept to successfully translate customers' needs into an effective product.

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