

Deeper ●

- Why would competitors cooperate in a joint best practices study?

Because they all expect to derive benefits from the study.

Ultimately, having best practices be well known and widely observed benefits everyone.

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- What factors contribute to “organizational inertia”?

Process changes are often stressful and difficult, so most organizations resist change.

People like to think of themselves as being smarter than everyone else, and this is threatened by the notion that other companies might have better processes.

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Deeper ●

- What is the difference between (1) being able to perform a task, and (2) to manage a task repeatably?

At level 1, individuals have the skills to perform the task.

At level 2, we can estimate and schedule tasks, monitor status, and deal with problems.

- Why is this an interesting difference?

At level 1, the capability is individual. At level 2, it begins to become organizational.

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Deeper ●

- What does level (3) add to level (2)?

At level 2, our management can estimate and schedule tasks, monitor status, and deal with problems.

At level 3, we have standard processes for planning tasks and managing their performance.

- Why is this an interesting difference?

We cannot manage our process unless we are following a process to begin with.

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Deeper ●

- What is the difference between (2) being able to repeatably manage a task, and (4) quantitative management?

At level 2, success is qualitatively repeatable.

At level 4, results become quantitatively predictable.

- Why is this an interesting difference?

It testifies to how well we understand our processes, and how much data we collect about their performance.

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Deeper ●

- What is the difference between (4) quantitative management and (5) optimization?

At level 4, we use captured data to plan and monitor our projects.

At level 5, we use captured data to refine our processes.

- Why is this an interesting difference?

It is at this level that we have institutionalized continuous improvement.

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Deeper (C)

- Why should we expect an organization with a higher CMM level to be more schedule or quality efficient?
They have more visibility into and control of their processes, so they should be better able to optimize them.
- How could this not be true?
People might not be taking the processes seriously. Process doesn't take the place of hard work.

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Deeper (D)

- What are the primary costs of root-cause analysis?
*Updating every bug report with correct domain, phase, and nature of problem information.
Investigating underlying causes and corrective process changes.*
- Is this likely to be paid back?
Only for the few causes that account for a highly disproportionate share of our bugs.

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Deeper (E)

- Where do we get the lists of the sub-categories into which we should place bugs for root-cause analysis?
*This is critical and difficult.
You can get lists from books, and other people, but the bottom line is that it probably requires some insight into what root causes are likely to be.*

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Deeper (F)

- What is the real difference here?
*Having a quantitative understanding of all causes of variation in the production process.
Trying to gain control of all input and process parameters that can cause unacceptable variation in our outputs.
Choosing measurements to monitor the performance of the process, rather than monitoring the acceptability of the products.*

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Deeper (G)

- Why must metrics be easily computable?
If the metric is too complex to compute, it may be too burdensome to use.
- Why must the computation be unique and unambiguous?
If we aren't sure what the value of the metric is, it will be difficult to use that value to manage system performance analysis.

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Deeper (H)

- What does it mean to be "well correlated" with the desired characteristic?
*It means that we can reasonably infer the characteristic of interest from the chosen metric.
Ideally, this implies a monotonic, linear, 1x1 mapping with low latency, and fine enough resolution to enable us to easily discriminate changes that correspond to interesting changes in the desired characteristic.*

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- What does empirically persuasive mean?

It seems clear that this metric is indeed well correlated with the attribute we wish to measure.

- Why is this important?

If we cannot justify the correlation between a metric and the underlying system attribute, that metric fails a basic goodness test.

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- Why is KLOC a useful metric?

More code is more work (to design, review, test, etc).

- How can we go wrong by over-depending on this metric?

It ignores execution path complexity, as well as communication and shared resource complexities, and must also be normalized for the language and tools.

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- Why is Kilobytes of code a useful metric?

It may once have been, but it probably isn't anymore.

- How can we go wrong by over-depending on this metric?

It considers all bytes to be equivalent in difficulty ... which simply isn't true.

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- Why is cyclomatic complexity a useful metric?

A cyclomatic complexity is probably better correlated with design and testing than simple code length.

- How can we go wrong by over-depending on this metric?

It ignores the complexities arising from data synchronization, asynchronous component interactions, data base consistency, etc.

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- Why is function points a useful metric?

The number of input and output parameters and files associated with a routine is probably monotonically related to its complexity .

- How can we go wrong by over-depending on this metric?

This ignores the complexity of the algorithms, and the presence/absence of shared use and other more profound causes of complexity.

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- Why is # requirement statements a useful metric?

The size of the required product might well be a monotonic function of the number of requirements statements.

- How can we go wrong by over-depending on this metric?

All requirements do not imply equal amounts of work.

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- How are coupling metrics useful?
As measures of interdependencies between modules, and the associated difficulty of design, coding and testing.
- How can we go wrong by over-depending on these metrics?
They count all interactions as equal, and ignore the nature and complexity of the interactions.

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- What are /KLOC based productivity metrics useful for?
Estimating how long it will take to perform a particular phase of the project.
- What corrections must we be prepared to apply to such metrics?
Relative code complexity, experience of the developers with the domain and tools, changes in tools and methodology.

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- What can bugs/KLOC estimates reasonably be used for?
To predict the total number of bugs that we expect to have to find and fix before we can ship the product.
- What corrections must we be prepared to apply to such metrics?
Code complexity and maturity, developer experience with the domain and tools, changes in development methodology.

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- What can bug discovery rate estimates reasonably be used for?
To estimate how many bugs might be produced by the next phase of testing.
- What corrections must we be prepared to apply to such metrics?
The relative maturity of the products, and differences in the testing techniques.

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- What can bug fix rate estimates reasonably be used for?
How long it will take to fix a particular set of bugs.
- What corrections must we be prepared to apply to such metrics?
Complexity of the problems, quality of the bug reports, familiarity of the developers with the code and tools.

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- How can we get early estimates of expected failures/customer/year?
Based on the failure rates seen in system test, alpha, and beta.
- How can we improve these estimates over time?
Based on actual customer problem reports.

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- What do we mean by don't be a slave to your metrics?

Remember the parable of the blind-men and the elephant. Metrics represent a few isolated snapshots, in a few dimensions.

Metrics help us to better understand our process, but they probably cannot fully capture the state of any process, product or person.

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- Why “no process w/o measurement”?
untested specifications are just noise.
- Why “no measurement w/o analysis”?
collecting data that will never be analyzed is a waste of everyone's time.
- Why “no analysis w/o action”?
If our analysis doesn't guide our actions, it is the wrong analysis.
If we ignore what the analysis tells us, we are managing blind-folded.

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- In what ways are all metrics flawed?

Any one metric can view only a single aspect of the product.

Not all metrics are well correlated with product goodness.

They can be “gamed” (optimized without materially improving the product).

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- How can we protect ourselves from these flaws?
Use multiple complementary metrics.
Continuously seek to validate and improve your metrics.
Try to design hard-to-game metrics, and actively dissuade metric gaming.

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