CS 428
Webster #3

Fall 2022

Bruce F. Webster

Lies, damned lies, and project metrics
[Part I, Part II, Part III] (Baseline, 2008)

⬥ Same problem as project estimation, but for a project already underway

  ⬥ Most organizations are very bad at predicting when a given project will ship

  ⬥ Usually rely on 'metrics' that aren't at all useful

⬥ A meaningful, useful project metric has three key qualities:

  ⬥ Informative/predictive: tells you something important and/or when you will deliver

  ⬥ Objective: should yield the same value regardless of who is doing the measuring

  ⬥ Automated: can be done quickly and without direct human intervention

⬥ Almost all major metrics used in IT projects lack one, two, or all three qualities

Metrics: Metric "Laws"

- **Weinberg's Law of Metrics:** "That which gets measured, gets fudged."

  - We will distort work and reporting to achieve required or valued metrics

- **The Metric Law of 90s:** "The first 90 percent of a development project takes 90 percent of the schedule. The remaining 10 percent of the project takes the other 90 percent of the schedule."

  - We tend to focus on low-hanging fruit in order to make metrics look good

- **The Metric Law of Least Resistance**: "The more human effort required to calculate a metric, the less often (and less accurately) it will be calculated, until it is abandoned or ignored altogether."

  - Hence the need for automation (cf. classic joke about drunk looking for keys)

- Must-read book: *Measuring and Managing Performance in Organizations* by Robert D. Austin (Dorset House, 1996)

Metrics: Visual Assessment in Real Life

◈ Why is project completion so hard to predict?

   ◇ The amount of analysis (gathering relevant subject-matter information) that still has to occur

   ◇ The amount of invention (novel problem solving) that still has to occur (cf Armour, as usual)

   ◇ The amount of discovery (e.g., running into roadblocks and dead ends) that still has to occur (again, Armour)

   ◇ The adequacy of the current architecture, design and implementation

   ◇ The amount of actual coding that still has to occur

   ◇ The amount of quality engineering (testing, reviews, etc.) that still has to occur

   ◇ Unexpected turnover among engineering personnel

   ◇ Changes in market requirements and/or opportunities

   ◇ Changes in external systems upon which you depend

Metrics: The challenge

Metrics: Potential approach to useful metrics

◈ First, instrumentation: automated collection of wide range of metrics/characteristics over time

  ◇ Result: time-stamped history for each metric/characteristic

  ◇ These should be automated and objective

  ◇ Can be tied to configuration management system and run on a regular basis

◈ Second, heuristics: use data collected

  ◇ After project is done and with known timeline, use Bayesian analysis to see which combination of metrics best anticipate milestone completion

  ◇ Use human analysis as well to look for correlations between metrics and actual progress (or lack thereof)

  ◇ Refine set of metrics/characteristics for next project and see how well they predict progress