CS 428 – Webster readings #4

Winter 2019

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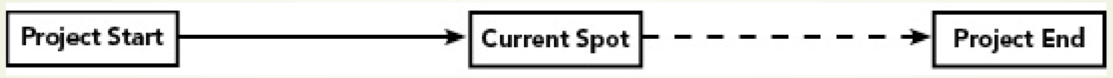
Lies, damned lies, and project metrics [Part I, Part II, Part III] (Baseline, 2008)

- 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

Metric "Laws"

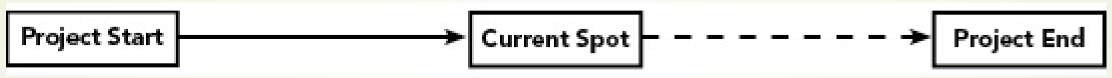
- **Weinberg's Law of Metrics:** "That which gets measured, gets fudged."
  - We will distort work and reporting to achieve required or valued metrics
- **The Metric Law of 90s:** "The first 90 percent of a development project takes 90 percent of the schedule. The remaining 10 percent of the project 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)

The challenge:



- 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

The challenge (cont.):



- Why is project completion so hard to predict?
  - Any and all remaining external dependencies (availability of resources, availability of technologies, deliveries from vendors and other projects, etc.)
  - The talent, experience and productivity of your IT engineers and managers, as well as turnover among those employees
  - The amount of business process re-engineering required to put this system into production, as well as the degree of resistance or cooperation among the affected business units
  - The complexity, cohesion and comprehensibility of the overall system
  - Other factors, such as scope creep, conflicting requirements, changes in business or market needs, budget constraints, or internal politics

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
- **NOTE**: Check out gitprime.com for a system that appears to do just this