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inside

YOUR VIEWS ON METRICS

Measurement Origins, When and Then, Provoking Us to Think Again

By Joe Schofield

Leadership often talks about software quality, but rarely invThe International Function Point Users Group (IFPUG) was formally organized in 1986, in Naperville, Illinois, U.S. The development of Function Point Analysis (FPA), based on Allan Albrecht's seminal work at IBM, became the foundation for the measurement of software based on its functional size. Today, through IFPUG, FPA has grown with a worldwide membership, professional certifications, international conferences, the emergence of SNAP[1] and supporting standards.[2,3] The popularity of FPA has spawned several other function point and function point-like counting methods.

Software measurement remains a daunting task. What do we measure? Under what conditions, without introducing a Hawthorne effect, can we measure? How do we collect those measures without the introduction of bias? How and where do we store measures? How long are those measures useful? What measures are comparable? How do we ensure we are measuring the right "things?" Are our measurements better than those we'd find from a random number generator? Who should collect the measures? Who is qualified to take measurements?[4] Do we want to divert energy from "real work" to feed values into tools? How long until we should expect to see "improvement?" How do other dynamics in the environment, business, process and organization impact what we measure and how those measurements are perceived?

Some of my own attempts to explore and invigorate the measurement discussion include: comparing lines of code to a random count of ants,[5] statistical analysis demonstrating that no competent team member could be predicted to write "better" or "worse" software in a diverse environment,[6] analyzing function points with use case points and story points,[7] Agile quality measurements,[8] tips on how to cheat with Agile measurements,[9] defect reduction through capture-recapture statistical processes[10] and even challenging how we employ six sigma techniques.[11]

With such a girth of content already written by numerous scholars, what's left to cover? Fortunately, or not, plenty remains to be examined. Thanks to tools in general, and software management tools in particular, we have way too much measurement data today[12] and it's only going to get worse. The world's insatiable appetite for data grows unabated. Direct feeding from team members and the automated collection of process data and performance measures are time consuming and often indigestible by the human mind alone. Distilling vast data dumps into meaningful insights is elusive as the data itself morphs and the sources increase faster than the thoughtful mind can reconfigure. Data centers are built for storing unprecedented volumes of bits and "the cloud" expands to accommodate a runaway collection of digital data awaiting its mining by analytics engines. We assemble the data in tables, present it in an array of charts, sort it, filter it, render it, plot it, trend it, predict it, balance it in scorecards and sometimes just ignore it. Professional sports teams play by it; nations govern by it; organizations determine their future by it; markets react to it. One might ask, who started all this measurement mania?

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Traces of the roots of measurement can be found in historical documents. One example is, "In the beginning…" so starts Genesis, "…God created the heavens and the earth." Reading on we note six days of creation and a day of rest. Aha! God started the counting; therefore, the blame surely rests with the Creator. While some think this conclusion settled, a more careful review may be warranted.

In the southern parts of Africa, the lower leg bone of a baboon may be the first measurement recording instrument. Some accounts date the Lebombo bone at more than 40,000 years.[13] Notches on the bone are depicted as tracking the lunar cycle and menstrual cycles—maybe even used to first describe the notion of being "late" in the start of a cycle, as opposed to being late on project milestone, a more modern and often, consequential usage.

The use of one's fingers has been suggested as the most likely first method of counting. Sexagesimal numerals were used in Babylonia to count time and angles[14]—thus the 60-minute hour and the 360 directional degrees with which we are familiar today. Perhaps "late" could be defined with more precision than the passing of a day on a primate's leg bone. Even today we tend to conflate precision and accuracy. Better to know that the occurrence of an event is a "notch" (day) late than to pretend that the same event is 2,880 minutes (48 hours) delayed and miss it by an entire notch.

The tracking of units of time addresses the first of the three "triple" constraints of time, cost and scope often used in project management today. Quality is also considered a constraint in many industries. Cost too originates in our ancient past. Excavated coins from circa 800 BC were discovered in the Temple of Artemis.[15] Between about 1000 and 600 BC dynasties and kingdoms in India are suspected of minting silver and copper coins.[16] Around 600 BC in what is today Turkey, Lydia's King Alyattes established what is believed to be the first currency. Due to the weight of hauling coinage, the Chinese are thought to be the first to use paper currency. Curiously, the Incas had no notion of a currency. In the 1600s furs were the preferred currency of Siberia. Yet, copper, silver and gold coins; paper "bills," electronic funds transfer (1800s), plastic (1940s), mobile (circa 2000), wearables and bits each played an evolutionary role in commerce and trade.[17] Bartering preceded all of these forms of currency and is still recognized as taxable in the U.S. by the Internal Revenue Service (IRS).[18]

The measurement of cost and schedule can certainly be traced back centuries if not millennia. What about the third dimension—scope? The evidence of ancient payments for bit and bytes is scant, actually, non-existent. But scope and size were often measured by weights and mass, using scales and pottery (though some may prefer the word "containers" today).

> "Even today we tend to conflate precision and accuracy."

Body parts were used to measure length: elbow to middle fingertip (cubit), hands and fingers in biblical times. The Greeks and Romans inherited the foot from the Egyptians and divided it into 12 inches. One thousand paces (mille passus) became a mile, a yard became 36 inches or the size of a man's waste line—definitely not to be considered medical advice. Pottery measured liquids and grains from 2 to 26 liters.[19]

Today we measure sea vessels by gross displacement tonnage, oil with barrels, natural gas with cubic feet, water in millions of gallons per second and acreage feet, gallons, liters and more; distance in light years, perfumes in ounces and illicit substances in grams. Obviously and intentionally, the preceding measures are but an abridged sample.

What if the measure of software, and related products and services were just as simple, and precise? Much as we've seen with the original FPA, innovators and differentiators would intervene to disrupt markets and the status quo. Marketing campaigns would petition C-level leadership that "there's a better way."

In the sustained history of change in the measurement world, different and more is sometimes valued over better, cheaper and less. Be wary of ongoing improvement cycles that aren't self-sustaining, objective, meaningful and minimal. For success with measurement systems, consider outcomes over outputs, impact over impactful, needs over haves and progress over change.

No doubt IFPUG will continue to play a leading role in attempts to quantify software capability. Like a diet or belt-tightening in a new year, can we survive with less? ■

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