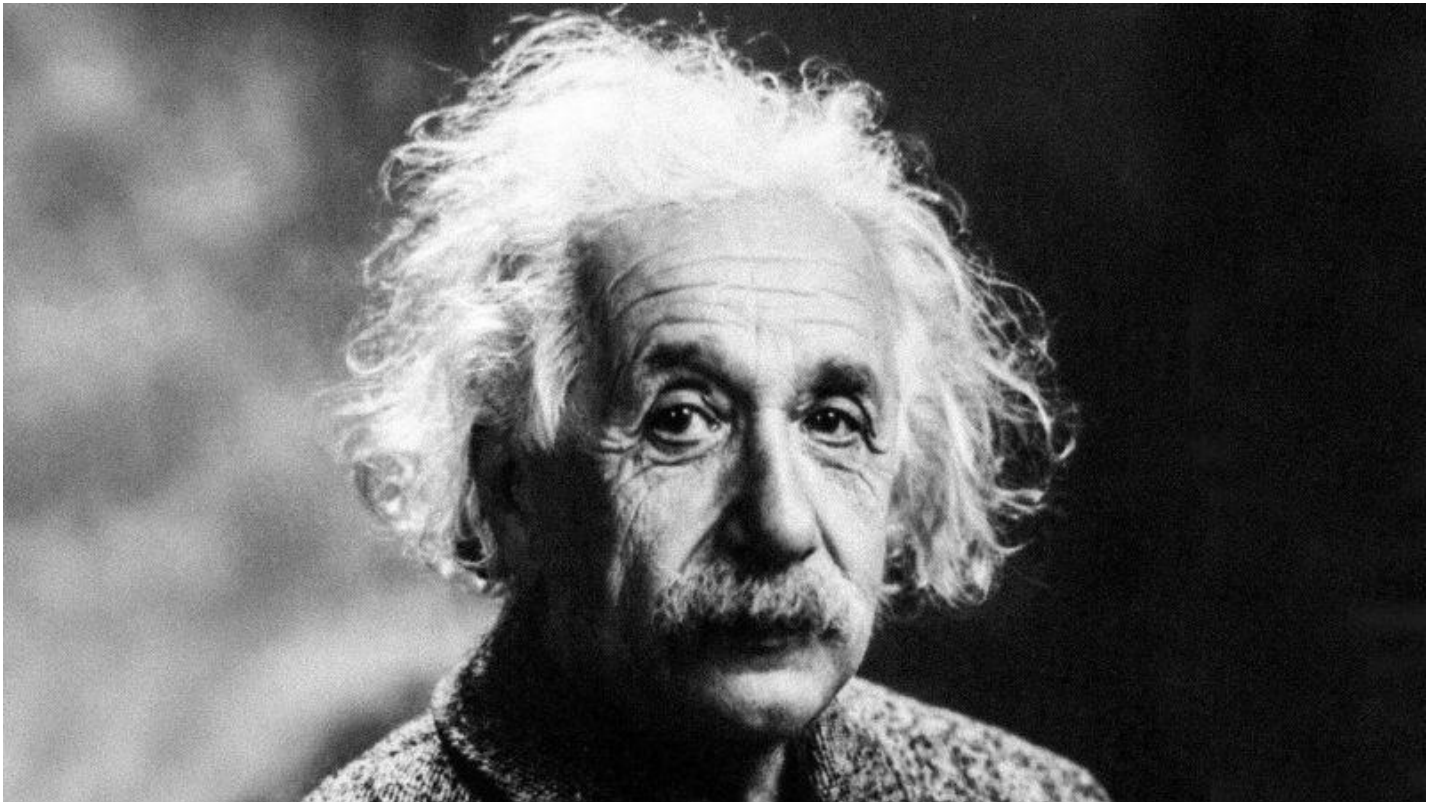# Einstein, Aristotle, and Ockham on how real geniuses solve difficult problems

MAYO OSHIN - OCTOBER 29, 2018 - THE LADDERS

The irony, like many things in life, is that solutions to our difficult problems have been right under our noses all along.

Born in late 1287, in the small village of Ockham in England, William of Ockham, a Franciscan friar and scholastic philosopher, wasn't one to shy away from airing his radical views.

The controversial figure spent much of his life on the run. In part for charges of heresy. And ironically, in part for brandishing Pope John XXII as a heretic.

But William of Ockham's legacy stretches much further than dramatic movie-like scenes. That is, the plot of a devout monk who rebukes the church's lavish lifestyle and advocates for Christ-like abject poverty, flees from capture on horseback under cover of darkness and takes refuge under the Holy Roman Emperor in Italy. [1]

Ockham's controversial views have profoundly influenced modern philosophy, science, theology and logic, and many great thinkers who have shaped history.

And as the old adage goes, "great minds think alike."And so, it is no coincidence that William of Ockham shared similar views with real geniuses like Aristotle, Thomas Aquinas, Einstein, Newton, Galileo, da Vinci and Hemingway.

There is, however, one strikingly similar idea that they all share in common.

It's an idea about problems—specifically, how to solve difficult problems in life and work, or as Aristotle writes in Posterior Analytics:

> *"We may assume the superiority ceteris paribus of the demonstration which derives from fewer postulates or hypotheses." (Aristotle, Posterior Analytics, p. 150.)*

Don't worry. If you couldn't comprehend Aristotle's words, keep reading to untangle them.

The obvious life saver

> *"Brevity is the soul of wit" — William Shakespeare*

In 2001, an adorable, bubbly, happy 18-month-old child, Josie King, wandered unsupervised into the bathroom of a brand new family home in Baltimore. [2]

In her usual playful curiosity, Josie leaned over the bathtub, stretched her little fingers to twist a knob and dipped her tiny toes into the gust of running water filling the bathtub.

Within a few seconds, Josie, the last born child of four children, unleashed a siren like loud scream. Her panicked parents rushed into the bathroom. A sorrowful 911 call was answered.

Josie was briskly rushed to the John Hopkins Bayview Medical Center. The 150 degree scorching water in the bathtub caused second degree burns and tore apart over 60% of the skin on Josie's body.

Josie survived the accident. But, there was a major problem.

Josie—now covered with sterile dressings and hooked up to tube machines in the hospital—appeared to struggle with thirst.

The medical staff paid no mind to this detail. But, they had inserted a thin tube, called the catheter, into Josie's veins.

Josie's desert-like craving for water worsened. Ms. King, Josie's mother, sounded the alarm. The nurses and doctors turned a blind eye. They were caught up in a chess game of bureaucracy.

Josie's eyes now appear to roll back into her head. Ms. King waves a signal of distress. Josie wrestles with a cardiac arrest. Josie's heart stops beating. Josie dies in the arms of her mother.

Who or what caused Josie's death? The hot bathtub water? The dehydration?

The answer: an infection caused by the catheter inserted into her veins. The hospital was at fault. And Josie wasn't a lone victim.

According to the C.D.C, an estimated 31,000 people die each year from bloodstream infections contracted in a similar fashion.

The catheter infection problem was an epidemic across hospitals. It killed more people than breast or prostate cancer in a given year.

Notably at the time, the infection rates after a catheter insertion were a whopping 11 per 1,000 patients at the John Hopkins Hospital—which ranked within the bottom 10 percent of hospitals in the USA. [3]

There were no solutions to this headache of a problem, and so, hospitals waved a white flag, and accepted the infections as the norm. Little girls like Josie would continue to die in an unceremonious manner.

But, Dr. Peter Pronovost, an intensive care specialist at Johns Hopkins Hospital, had had enough of the high mortality. He lamented, "This can be stopped. Hospital infections aren't like a disease there's no cure for."

Pronovost took the bull by the horns and proposed a new solution to solve the infection problem.

Unlike preceding complex solutions that failed to save the Josie's of the world, Pronovost took a peculiar route.

His solution was awfully simple: a plain old checklist.

The checklist included instructions like: wash your hands with soap before inserting the catheter, cover the patients with sterile drapes, make sure that doctors and nurses wear gloves, hats, masks and gowns. These were simple, obvious directions that virtually all medical professionals had known.

In what was known as the Keynote Initiative, Pronovost put his elementary checklist to the test in hospitals resided in the city of Michigan. [4]

Pronovost declared. Doctors and nurses hemmed and hawed. Executives scoffed.

After the first three months of hospitals implementing the checklist, the central line infection rate in Michigan's hospitals magnificently dropped by sixty-six percent—outperforming over 90 percent of ICUs across the USA.

Over the span of an eighteen month period, Pronovosts' checklist saved more than 1,500 lives and an estimated $175 million in health care costs. (**Source:** The Checklist Manifesto: How to Get Things Right)

Pronovost had stumbled upon a supreme philosophy shared by many of the greatest minds in the history of mankind.

That philosophy exhorts the idea that difficult problems are best solved by the most simple solution.

And this idea is best encapsulated by a **useful heuristic**. It's called the Occam's Razor.

The power of Occam's Razor

> "Simplicity Is Complexity Resolved" — Constantin Brancusi

After several close shaves and before his passing away in 1347, Ockham expressed strong sentiments based on the principle of parsimony, which says, "don't multiply entities beyond necessity."

In other words, given a choice between a simple or a complex solution, the former is often the correct answer to a given problem.

Ockham's minimalist philosophy was later formalized as the *Occam's Razor*—although he didn't invent the underlying logic of simplicity.

The term *razor* is a befitting expression of the process of simplifying or 'shaving' off the inessential details of a proposed solution.

Following Ockham's death, several prominent figures throughout history have adopted Occam's Razor to solve difficult problems that would later revolutionize the way we think and live today.

In the beginning of Book III of *Principia Mathematica* (1687), Sir Isaac Newton imports a version of Occam's Razor as one of his three 'Rules of Reasoning in Philosophy':

> *Rule I: We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances.*

Newton elaborates his point by explaining that:

> *"Nature is pleased with simplicity, and affects not the pomp of superfluous causes."* [5]

Then, in 1963, Einstein wrote that:

> *"The grand aim of all science…is to cover the greatest possible number of empirical facts by logical deductions from the smallest possible number of hypotheses or axioms."* [6]

Einstein's iconic simple equation, $E=MC^2$, is a poster child example of how to solve difficult problems using Occam's Razor.

Employing only two variables and one constant, Einstein solved the ancient complex problem of the relationship between matter and energy.

The invisible hand of Occam's Razor has influenced virtually all aspects of modern breakthroughs.

Whether it's the minimalist designs of Frank Lloyd Wright's modern homes or Steve Jobs iPhone and Mac computers, Adam Smith's Wealth of Nations or Darwin's Natural Selection, Watson's DNA discovery or Hemingway's Iceberg theory, Occam's Razor has been an invaluable tool for solving a wide spectrum of complex problems across a plethora of disciplines.

But the use of Occam's Razor isn't limited to once in a generation geniuses. It can also be adopted as a weapon to solve difficult problems in everyday life.

Keep it simple, stupid

"Life is really simple, but we insist on making it complicated." — Confucius

There appears to be a puzzling journey that we travel through, from simplicity to complexity.
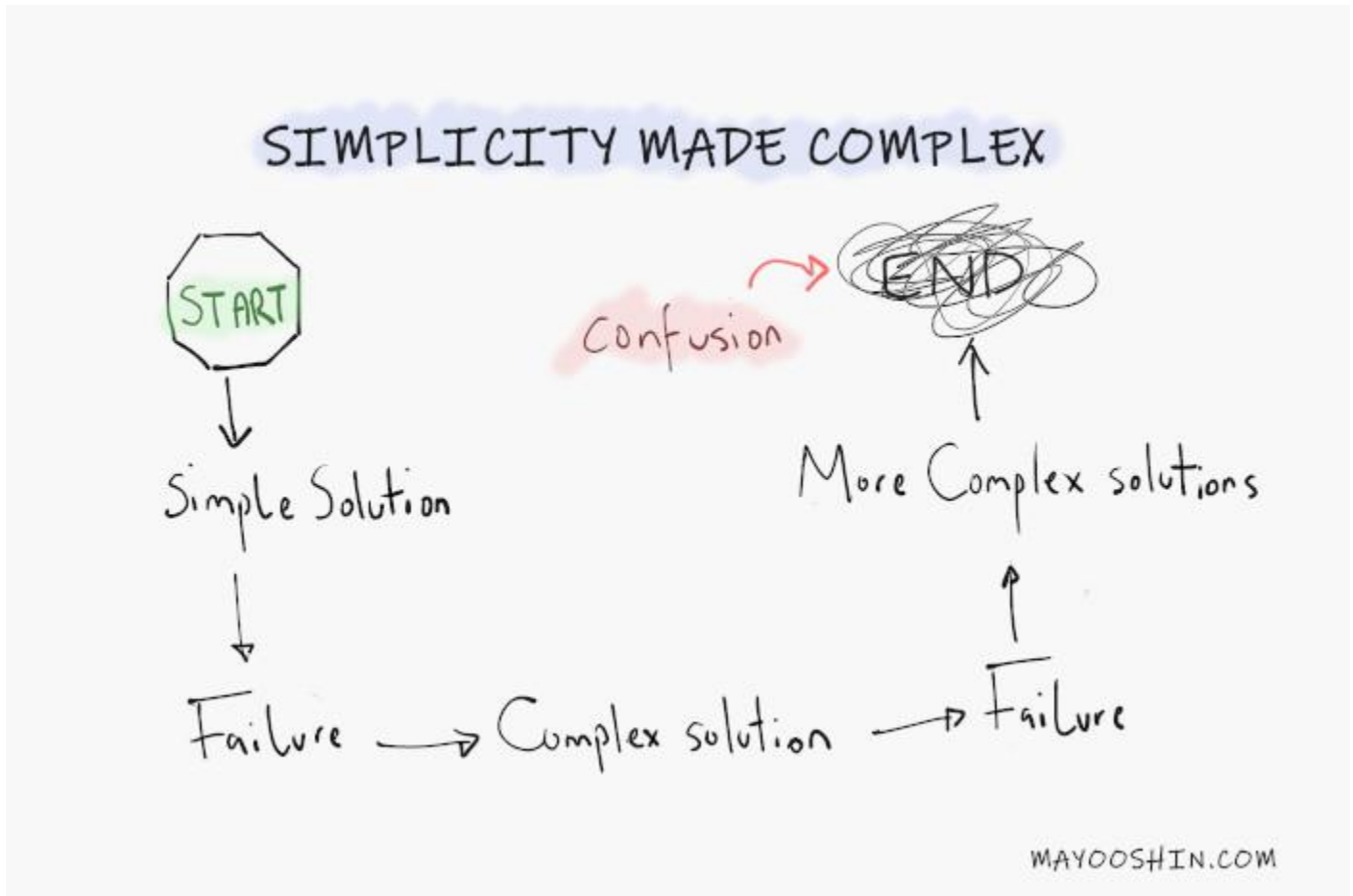
First, we try our hands on a simple solution. In this case, let's say we attempt to sleep for eight hours each night in order to improve our health.

Then, when we struggle to **follow through on our plans**, we throw the simple solution out with the bathwater and just like treasure-seeking pirates, hunt for a more complex quick fix.

And of course, at this point, the wolf licking advertising companies, fitness trainers and Instagram celebrities, begin to salivate at the prospect of devouring the monetary contents of our wallet in exchange for their 'magic pill' promises to solve said health problems.

We oblige them. And feed the mouth of the barely regulated USD 133.1 billion supplement industry and USD 87.23 billion fitness club outfits. [7]

But, what happens when they fail to deliver on their tantalizing promises? We throw ourselves into a frenzy in search of the next best complex solution: complicated fitness apps, fat burning supplements, robotic ab machines, feather-light running shoes, eight meals a day diet plans and 'smart' watches.

How real geniuses solve difficult problems   5

Then predictably those also go downhill. And the Sherlock Holmes-like search for the 'mysterious' solution continues.

This vicious cycle can be sidestepped through perseverance with a simple solution.

For example, for years I scratched my head searching for the best way to improve my writing and build an audience.

I devoured volumes of articles online, invested in countless training courses and sheepishly followed expert advice. But, I wasn't making visible headway. Plus, my bank account had become chummy with Mr. Overdraft. And so, out of pure frustration, I quit my colonial quest for a perfect solution.

As it turns out, what's worked best for me so far is to write, publish and share at least one article each week. Simples.

It's not interesting. It's not sexy. But, it works. And likewise, the simple solution…

To problems with weight loss is to **eat healthy meals** consisting of fruits and vegetables, exercise regularly, drink plenty of water and **sleep at least 8 hours a day**.

To problems with relationships is to **express gratitude** often, listen more than you speak and set aside time for intimacy.

To problems with personal finances is to save money for an emergency fund, minimize expenses, invest in assets and stick to a fixed budget.

To problems with productivity is to **build the habit of finishing**, **focus on the most important things early in the day** and **create a distraction free environment**.

To problems with leadership is to **practice empathy**, celebrate small achievements and reinforce the vision through leading by example.

A common error that sways us to fall into the deep pothole of complexity, is the naive assumption that simplicity is an easy feat to pull off.

But, as the late Steve Jobs expressed:

> "Simple can be harder than complex: you have to work hard to get your thinking clean to make it simple. But it's worth it in the end because once you get there, you can move mountains." (Interview with Wired, 1996)

Sticking with simple solutions through thick and thin, can often be terribly strenuous. But, the fruitful results are always worth the wait.

The takeaway

The irony, like many things in life, is that solutions to our difficult problems have been right under our noses all along.

Throughout history, the greatest minds—from Aristotle to William of Ockham to Einstein—have stumbled upon the unmistakable truths of the Occam's Razor. That is, the simplest solution to any given problem is the best one.

But, this flies in the face of mainstream beliefs that complex solutions are harder to implement and better for problem-solving.

In reality, complexity is the easy way out. And simplicity is hard work—and the most powerful tool for solving difficult problems.

Simplicity is an art. A thing of beauty. And in the words of the real genius, Leonardo da Vinci:

> "Simplicity is the ultimate sophistication."

Mayo Oshin writes at [MayoOshin.Com](#), where he shares the best practical ideas based on proven science and the habits of highly successful people for stress-free productivity and improved mental performance. To get these strategies to stop procrastinating, get more things by doing less and improve your focus, [join his free weekly newsletter](#)."

A version of this [article](#) originally appeared at [mayooshin.com](#) as ["Einstein, Aristotle and Ockham on How Real Geniuses Solve Difficult Problems."](#)

Footnotes

1. Courtenay, William J., 1999. "The Academic and Intellectual Worlds of Ockham." In Spade [1999], Chap. 1 (pp. 17–30).
2. [Josie's Story](#) by Sorrel King.
3. Dr. Pronovost [interview](#) with The New York Times.
4. Pronovost et al (2006). [An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU](#). The New England journal of medicine. 355. 2725-32. 10.1056/NEJMoa061115.
5. Newton, I. 1999. The Principia: Mathematical Principles of Natural Philosophy; A New Translation by I. Bernard Cohen and Anne Whitman. Berkeley: University of California Press.
6. Einstein, A. 1954. Ideas and Opinions. New York: Crown.
7. Fitness club industry [size](#) and Supplement Industry [size](#).
8. **Some food for thought:** How do we define simplicity? And how simple is simple enough?