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Six problem-solving mindsets for very uncertain times

Even the most inscrutable problems have solutions—or better outcomes than have been reached so far. Here's how the best problem solvers crack the code.

by Charles Conn and Robert McLean

Great problem solvers are made, not born. That's what we've found after decades of problem solving with leaders across business, nonprofit, and policy sectors. These leaders learn to adopt a particularly open and curious mindset, and adhere to a systematic process for cracking even the most inscrutable problems. They're terrific problem solvers under any conditions. And when conditions of uncertainty are at their peak, they're at their brilliant best.

Six mutually reinforcing approaches underly their success: (1) being *ever-curious* about every element of a problem; (2) being *imperfectionists*, with a high tolerance for ambiguity; (3) having a *"dragonfly eye"* view of the world, to see through multiple lenses; (4) pursuing *occurrent behavior* and experimenting relentlessly; (5) tapping into the *collective intelligence*, acknowledging that the smartest people are not in the room; and (6) practicing *"show and tell,"* because storytelling begets action (exhibit).

Here's how they do it.

1. Be ever-curious

As any parent knows, four-year-olds are unceasing askers. Think of the never-ending "whys" that make little children so delightful—and relentless. For the very young, everything is new and wildly uncertain. But they're on a mission of discovery, and they're determined to figure things out. And they're good at it! That high-energy inquisitiveness is why we have high shelves and childproof bottles.

When you face radical uncertainty, remember your four-year-old or channel the four-year-old within you. Relentlessly ask, "Why is this so?" Unfortunately, somewhere

Exhibit

Faced with an inscrutable problem? Try a more creative approach.

between preschool and the boardroom, we tend to stop asking. Our brains make sense of massive numbers of data points by imposing patterns that have worked for us and other humans in the past. That's why a simple technique, worth employing at the beginning of problem solving, is simply to pause and ask *why* conditions or assumptions are so until you arrive at the root of the problem.[1]

Natural human biases in decision making, including confirmation, availability, and anchoring biases, often cause us to shut down the range of solutions too early.[2] Better—and more creative—solutions come from being curious about the broader range of potential answers.

One simple suggestion from author and economist Caroline Webb to generate more curiosity in team problem solving is to put a question mark behind your initial hypotheses or first-cut answers. This small artifice is surprisingly powerful: it tends to encourage multiple solution paths and puts the focus, correctly, on assembling evidence. We also like thesis/antithesis, or red team/blue team, sessions, in which you divide a group into opposing teams that argue against the early answers—typically,

[1] This approach was originally developed by Sakichi Toyoda, the founder of Toyota.

[2] Daniel Kahneman, *Thinking, Fast and Slow*, New York, NY: Farrar, Straus and Giroux, 2011.

more traditional conclusions that are more likely to come from a conventional pattern. Why is *this* solution better? Why not *that* one? We've found that better results come from embracing uncertainty. Curiosity is the engine of creativity.

2. Tolerate ambiguity—and stay humble!

When we think of problem solvers, many of us tend to picture a poised and brilliant engineer. We may imagine a mastermind who knows what she's doing and approaches a problem with purpose. The reality, though, is that most good problem solving has a lot of trial and error; it's more like the apparent randomness of rugby than the precision of linear programming. We form hypotheses, porpoise into the data, and then surface and refine (or throw out) our initial guess at the answer. This above all requires an embrace of imperfection and a tolerance for ambiguity—and a gambler's sense of probabilities.

The real world is highly uncertain. Reality unfolds as the complex product of stochastic events and human reactions. The impact of COVID-19 is but one example: we address the health and economic effects of the disease, and their complex interactions, with almost no prior knowledge. We have to be comfortable with estimating probabilities to make good decisions, even when these guesses are imperfect. Unfortunately, we have truckloads of evidence showing that human beings aren't good intuitive statisticians. Guesses based on gut instinct can be wildly wrong. That's why one of the keys to operating in uncertain environments is epistemic humility, which Erik Angner defines as "the realization that our knowledge is always provisional and incomplete—and that it might require revision in light of new evidence."[3]

Recent research shows that we are better at solving problems when we think in terms of odds rather than certainties.[4] For example, when the Australian research body Commonwealth Scientific and Industrial Research Organisation (CSIRO), which owned a core patent on the wireless internet protocol, sought royalties from major companies, it was initially rebuffed. The CSIRO bet that it could go to court to protect its intellectual property because it estimated that it needed only 10 percent odds of success for this to be a good wager, given the legal costs and likely payoff. It improved its odds by picking the weakest of the IP violators and selecting a legal jurisdiction that favored plaintiffs. This probabilistic thinking paid off and eventually led to settlements to CSIRO exceeding $500 million.[5] A tolerance for ambiguity and a willingness to play the odds helped the organization feel its way to a good solution path.

To embrace imperfectionism with epistemic humility, start by challenging solutions that imply certainty. You can do that in the nicest way by asking questions such as "What would we have to believe for this to be true?" This brings to the surface implicit assumptions about probabilities and makes it easier to assess alternatives. When uncertainty is high, see if you can make small moves or acquire information at a reasonable cost to edge out into a solution set. Perfect knowledge is in short supply, particularly for complex business and societal problems. Embracing imperfection can lead

[3] Erik Angner, "Epistemic humility—knowing your limits in a pandemic," *Behavioral Scientist*, April 13, 2020, behavioralscientist.org.

[4] Annie Duke, *Thinking in Terms of Bets: Making Smarter Decisions When You Don't Have All the Facts*, New York, NY: Portfolio/Penguin, 2018.

[5] CSIRO briefing to US Government, December 5, 2006.

to more effective problem solving. It's practically a must in situations of high uncertainty, such as the beginning of a problem-solving process or during an emergency.

3. Take a dragonfly-eye view

Dragonfly-eye perception is common to great problem solvers. Dragonflies have large, compound eyes, with thousands of lenses and photoreceptors sensitive to different wavelengths of light. Although we don't know exactly how their insect brains process all this visual information, by analogy they see multiple perspectives not available to humans. The idea of a dragonfly eye taking in 360 degrees of perception[6] is an attribute of "superforecasters"—people, often without domain expertise, who are the best at forecasting events.

Think of this as widening the aperture on a problem or viewing it through multiple lenses. The object is to see beyond the familiar tropes into which our pattern-recognizing brains want to assemble perceptions. By widening the aperture, we can identify threats or opportunities beyond the periphery of vision.

Consider the outbreak of HIV in India in the early 1990s—a major public-health threat. Ashok Alexander, director of the Bill & Melinda Gates Foundation's India Aids Initiative, provided a brilliant example of not just vision but also dragonfly vision. Facing a complex social map with a rapidly increasing infection rate, he widened the problem's definition, from a traditional epidemiological HIV transmission model at known "hot spots" to one in which sex workers facing violence were made the centerpiece.

This approach led to the "Avahan solution," which addressed a broader set of leverage points by including the sociocultural context of sex work. The solution was rolled out to more than 600 communities and eventually credited with preventing 600,000 infections. The narrow medical perspective was sensible and expected, but it didn't tap into the related issue of violence against sex workers, which yielded a richer solution set. Often, a secret unlocks itself only when one looks at a problem from multiple perspectives, including some that initially seem orthogonal.

The secret to developing a dragonfly-eye view is to "anchor outside" rather than inside when faced with problems of uncertainty and opportunity. Take the broader ecosystem as a starting point. That will encourage you to talk with customers, suppliers, or, better yet, players in a different but related industry or space. Going through the customer journey with design-thinking in mind is another powerful way to get a 360-degree view of a problem. But take note: when decision makers face highly constrained time frames or resources, they may have to narrow the aperture and deliver a tight, conventional answer.

4. Pursue occurrent behavior

Occurrent behavior is what *actually* happens in a time and place, not what was potential or predicted behavior. Complex problems don't give up their secrets easily. But that shouldn't deter problem solvers from exploring whether evidence on the facets of a

[6] Philip Tetlock and Dan Gardner, *Superforecasting: The Art and Science of Prediction*, New York, NY: Crown, 2015.

solution can be observed, or running experiments to test hypotheses. You can think of this approach as creating data rather than just looking for what has been collected already. It's critical for new market entry—or new market creation. It also comes in handy should you find that crunching old data is leading to stale solutions.

Most of the problem-solving teams we are involved with have twin dilemmas of uncertainty and complexity, at times combined as truly "wicked problems."[7] For companies ambitious to win in the great unknown in an emerging segment—such as electric cars or autonomous vehicles, where the market isn't fully established—good problem solving typically involves designing experiments to reduce key uncertainties, not just relying on existing data. Each move (such as buying IP or acquiring a component supplier) and each experiment (including on-road closed tests) not only provides additional information to make decisions but also builds capabilities and assets that support further steps. Over time, their experiments, including alliances and acquisitions, come to resemble staircases that lead to either the goal or the abandonment of the goal. Problem-solving organizations can "bootstrap" themselves into highly uncertain new spaces, building information, foundational assets, and confidence as they take steps forward.

Risk-embracing problem solvers find a solution path by constantly experimenting. Statisticians use the abbreviation EVPI—the expected value of perfect information—to show the value of gaining additional information that typically comes from samples and experiments, such as responses to price changes in particular markets. A/B testing is a powerful tool for experimenting with prices, promotions, and other features and is particularly useful for digital marketplaces and consumer goods. Online marketplaces make A/B testing easy. Yet most conventional markets also offer opportunities to mimic the market's segmentation and use it to test different approaches.

The mindset required to be a restless experimenter is consistent with the notion in start-ups of "failing fast." It means that you get product and customer affirmation or rejection quickly through beta tests and trial offerings. Don't take a lack of external data as an impediment—it may actually be a gift, since purchasable data is almost always from a conventional way of meeting needs, and is available to your competitors too. Your own experiments allow you to generate your own data; this gives you insights that others don't have. If it is difficult (or unethical) to experiment, look for the "natural experiments" provided by different policies in similar locations. An example would be to compare outcomes in twin cities, such as Minneapolis–St. Paul.

5. Tap into collective intelligence and the wisdom of the crowd

Chris Bradley, a coauthor of Strategy *Beyond the Hockey Stick*,[8] observed that "it's a mistake to think that on your team you have the smartest people in the room. They aren't there. They're invariably somewhere else."[9] Nor do they need to be there if you can access their intelligence via other means. In an ever-changing world where

[7] A term coined in a now famous 1973 article: Horst W. J. Rittel and Melvin Webber, "Dilemmas in a general theory of planning," *Policy Sciences*, 1973, Number 4, pp. 155–69.

[8] Chris Bradley, Marin Hirt, and Sven Smit, *Strategy Beyond the Hockey Stick: People, Probabilities, and Big Moves to Beat the Odds*, Hoboken, NJ: Wiley, 2018.

[9] For more from Chris Bradley, in a conversation with Rob McLean, see "Want better strategies? Become a bulletproof problem solver," August 2019, McKinsey.com.

conditions can evolve unpredictably, crowdsourcing invites the smartest people in the world to work with you. For example, in seeking a machine-learning algorithm to identify fish catch species and quantities on fishing boats, the Nature Conservancy (TNC) turned to Kaggle and offered a $150,000 prize for the best algorithm. This offer attracted 2,293 teams from all over the world. TNC now uses the winning algorithm to identify fish types and sizes caught on fishing boats in Asia to protect endangered Pacific tuna and other species.

Crowdsourced problem solving is familiar in another guise: benchmarking. When Sir Rod Carnegie was CEO of Conzinc Riotinto Australia (CRA), he was concerned about the costs of unscheduled downtime with heavy trucks, particularly those requiring tire changes. He asked his management team who was best in the world at changing tires; their answer was Formula One, the auto-racing competition. A team traveled to the United Kingdom to learn best practice for tire changes in racetrack pits and then implemented what it learned thousands of miles away, in the Pilbara region of Western Australia. The smartest team for this problem wasn't in the mining industry at all.

Of course, while crowdsourcing can be useful when conventional thinking yields solutions that are too expensive or incomplete for the challenge at hand, it has its limitations. Good crowdsourcing takes time to set up, can be expensive, and may signal to your competitors what you are up to. Beware of hidden costs, such as inadvertently divulging information and having to sieve through huge volumes of irrelevant, inferior suggestions to find the rare gem of a solution.

Accept that it's OK to draw on diverse experiences and expertise other than your own. Start with brainstorming sessions that engage people from outside your team. Try broader crowdsourcing competitions to generate ideas. Or bring in deep-learning talent to see what insights exist in your data that conventional approaches haven't brought to light. The broader the circles of information you access, the more likely it is that your solutions will be novel and creative.

6. Show and tell to drive action

We started our list of mindsets with a reference to children, and we return to children now, with "show and tell." As you no doubt remember—back when you were more curious!—show and tell is an elementary-school activity. It's not usually associated with problem solving, but it probably piqued your interest. In fact, this approach is critical to problem solving. Show and tell is how you connect your audience with the problem and then use combinations of logic and persuasion to get action.

The show-and-tell mindset aims to bring decision makers into a problem-solving domain you have created. A team from the Nature Conservancy, for instance, was presenting a proposal asking a philanthropic foundation to support the restoration of oyster reefs. Before the presentation, the team brought 17 plastic buckets of water into the boardroom and placed them around the perimeter. When the foundation's staff members entered the room, they immediately wanted to know what the buckets were for. The team explained that oyster-reef restoration massively improves water quality because each oyster filters 17 buckets of water per day. Fish stocks improve, and

oysters can also be harvested to help make the economics work. The decision makers were brought into the problem-solving domain through show and tell. They approved the funding requested and loved the physical dimension of the problem they were part of solving.

Rookie problem solvers show you their analytic process and mathematics to convince you that they are clever. That's sometimes called APK, the anxious parade of knowledge. But seasoned problem solvers show you differently. The most elegant problem solving is that which makes the solution obvious. The late economist Herb Simon put it this way: "Solving a problem simply means representing it so as to make the solution transparent."[10]

To get better at show and tell, start by being clear about the action that should flow from your problem solving and findings: the governing idea for change. Then find a way to present your logic visually so that the path to answers can be debated and embraced. Present the argument emotionally as well as logically, and show why the preferred action offers an attractive balance between risks and rewards. But don't stop there. Spell out the risks of inaction, which often have a higher cost than imperfect actions have.

The mindsets of great problem solvers are just as important as the methods they employ. A mindset that encourages curiosity, embraces imperfection, rewards a dragonfly-eye view of the problem, creates new data from experiments and collective intelligence, and drives action through compelling show-and-tell storytelling creates radical new possibilities under high levels of unpredictability. Of course, these approaches can be helpful in a broad range of circumstances, but in times of massive uncertainty, they are essential. Q

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[10] Herbert Simon, *The Sciences of the Artificial*, Cambridge, MA: MIT Press, 1969.