The Toyota Way and Toyota Kata: How Do They Fit?

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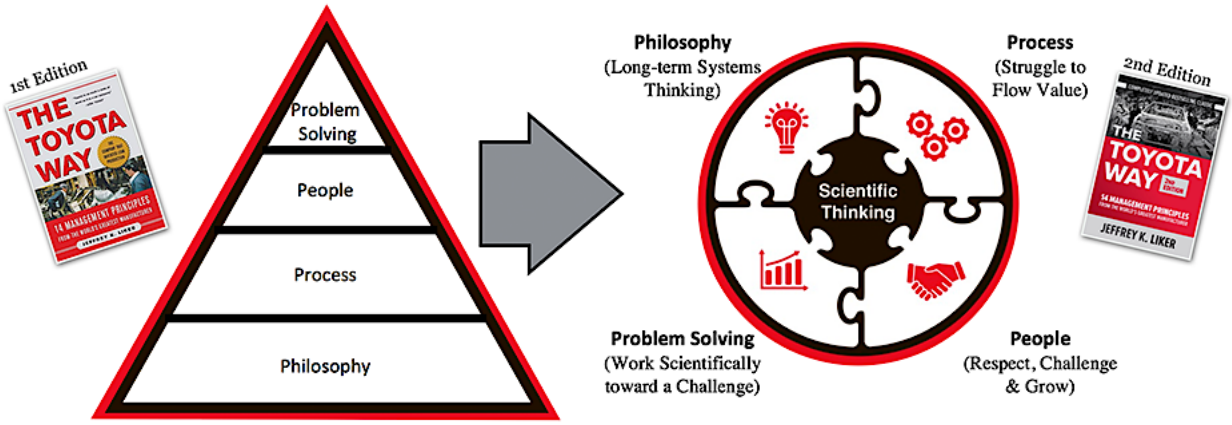


I'd like to clear up some confusion about the relationship between the Toyota Way and Toyota Kata.

The Toyota Way (which I discuss in the new, second edition of my book *The Toyota Way*) summarizes the management system Toyota has evolved over the last century, while Toyota Kata was developed by Mike Rother for a specific purpose—as practice routines to begin to develop the rudiments of scientific thinking. Are these two systems compatible or do we have to choose one to believe in? I have had an insider seat to both, since I have been studying Toyota for over 35 years and Mike was my graduate student at University of Michigan, and we regularly have long discussions over coffee.

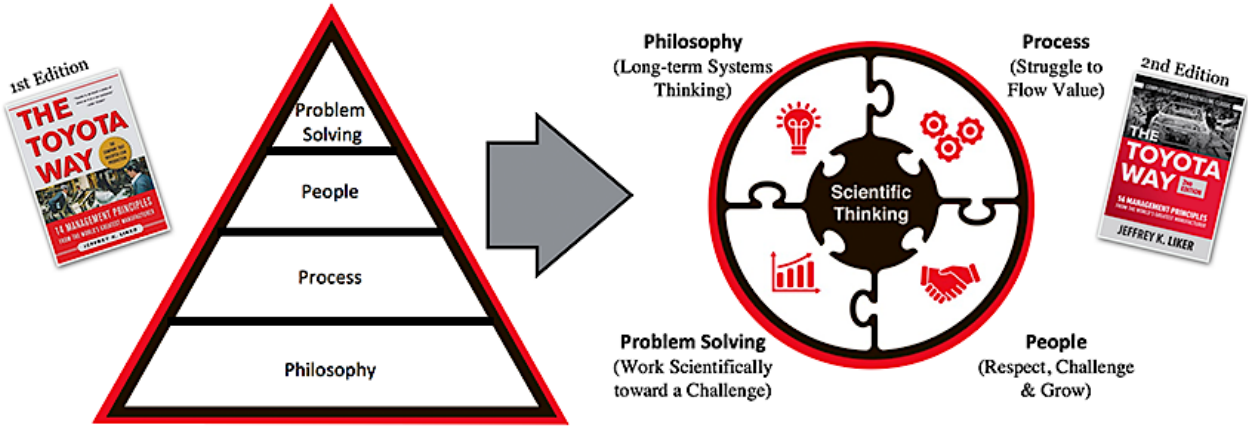
My overall conclusion is that while I was deriving general management principles from my learning about Toyota, Mike was diving into a practical approach to one of the core aspects—scientific thinking and how to get it into the heads of us mere mortals. Mike's model of scientific thinking—the Improvement Kata Pattern—was derived from watching some of the best TPS masters in Toyota at work. He then went beyond the conceptual model to help

others learn how to do this themselves through an age-old approach to mastering complex skills—practice!

> *The term scientific thinking can be confusing and might spark the picture of a lone scientist sitting in the lab conducting some fundamental research and developing abstract models. We are actually trying to develop people who work to achieve difficult goals in a scientific way. This can be thought of as "practical scientific thinking".*

Based on my long discussions with Mike, and some soul searching myself as to where this all fits together, I changed the foundational 4P model of The Toyota Way to place scientific thinking in the center (Figure 1).

Figure 1: Scientific Thinking & the Toyota Way as a System



Putting Scientific Thinking at the Core

In the first edition published in 2004 I represented the model as a house, with philosophy on the bottom and problem-solving on the top. Scientific thinking would seem to be a part of problem-solving. After thinking more about it I made two major changes to the model for the 2020 second edition:

1. I turned it into a set of interconnected puzzle pieces as they are all interrelated as a system.

2. I put scientific thinking at the center after concluding that all of the principles are more effective with a scientific approach. For example, the process principles would seem to be straightforward implementation of tools like a work cell. But with a scientific approach you start with a purpose, such as one-piece flow of value to customers, and then experiment with approaches to achieve this continually learning and refining.

While "scientific thinking" may seem new and perhaps theoretical, it is consistent with Toyota's teachings, going back to the first TPS manual by Ohno:

> "On the shopfloor it is important to start with the actual phenomenon and search for the root cause in order to solve the problem. In other words, we must emphasize getting the facts."

One of Ohno's students, Hajime Ohba, later explained in a public presentation:

> "TPS is built on the scientific way of thinking…. How do I respond to this problem? Not a toolbox. [You have to be] willing to start small, learn through trial and error."

In his excellent 2004 Harvard Business Review article on *Learning to Lead at Toyota*, Steven Spear discusses the rigor with which Toyota trains all its managers to be scientific thinkers:

> "Trainees watch employees work and machines operate, looking for visible problems… Learners articulate their hypotheses about changes' potential impact, then use experiments to test their hypotheses. They explain gaps between predicted and actual results… Supervisors act as coaches, not problem solvers. They teach trainees to observe and experiment."

Compare this with Rother's practical view of scientific thinking for the rest of us who are not PhD scientists:

- Acknowledging that our comprehension is always incomplete and possibly wrong.

- Assuming that answers will be found by testing rather than just deliberation.
- Appreciating that differences between what we predict will happen and what actually happens can be a useful source of learning and corrective adjustment.

Mike wanted to go beyond elucidating principles of scientific thinking, so he arrived at the approach of daily practice via kata. Kata in Japanese martial arts like Karate are specific movements that the master teaches to the learner through demonstration, and then watching the learner try, repeatedly, until the student achieves some level of mastery of that specific, building-block skill. This then leads to mastering the next kata, and next, and next. Over time the karate student moves from practicing individual kata to putting them together in a fight as demanded by the situation. Those who have seen *The Karate Kid* have seen kata in practice, and those who have watched a Jazz band play have seen the results in action.

> *Mike provided us with the Improvement Kata—including a set of practice routines, or "Starter Kata," for each stage of the model, which can be used as a regimen to deliberately practice.*

All of our skills and ways of thinking occur in our brain. Routine actions like maneuvering our car are bundles of connected neurons that we can call up sort of like computers call up subroutines. The problem is our natural subroutines for solving problems program us to quickly imagine solutions, before deliberately thinking through the problem definition and understanding the current condition. There has been a lot of advice in the name of learning “problem solving” to stop doing that and instead systematically go through a number of steps to Plan-Do-Check-Act systematically. But it is clear that telling people to do this is not enough; and several-day problem solving workshops are not enough to create new, counter-intuitive neural circuits.

It is tempting to try to devise a way to flush our minds clean of these old thinking habits, but what is in our brain does not in any natural way get wiped like we can do to a computer memory. Instead, we have to build new neurological structures which when strengthened through practice become our go-to for addressing problems. The old well-worn ways of fast thinking start to

fade into the background since we do not use them and the new slow-thinking patterns start to feel more natural. We are practicing, or should I say “deliberately practicing,” a new way and in doing so rewiring our brains.

Create Daily Habits of Deliberate Practice

Toyota managers are taught this from when they are hired and it is reinforced by their coaches daily. For the rest of us, we need some regimen to deliberately practice. Mike provided us with the Improvement Kata—including a set of practice routines, or "Starter Kata," for each stage of the model (Figure 2).

Figure 2: Practice, Practice, Practice

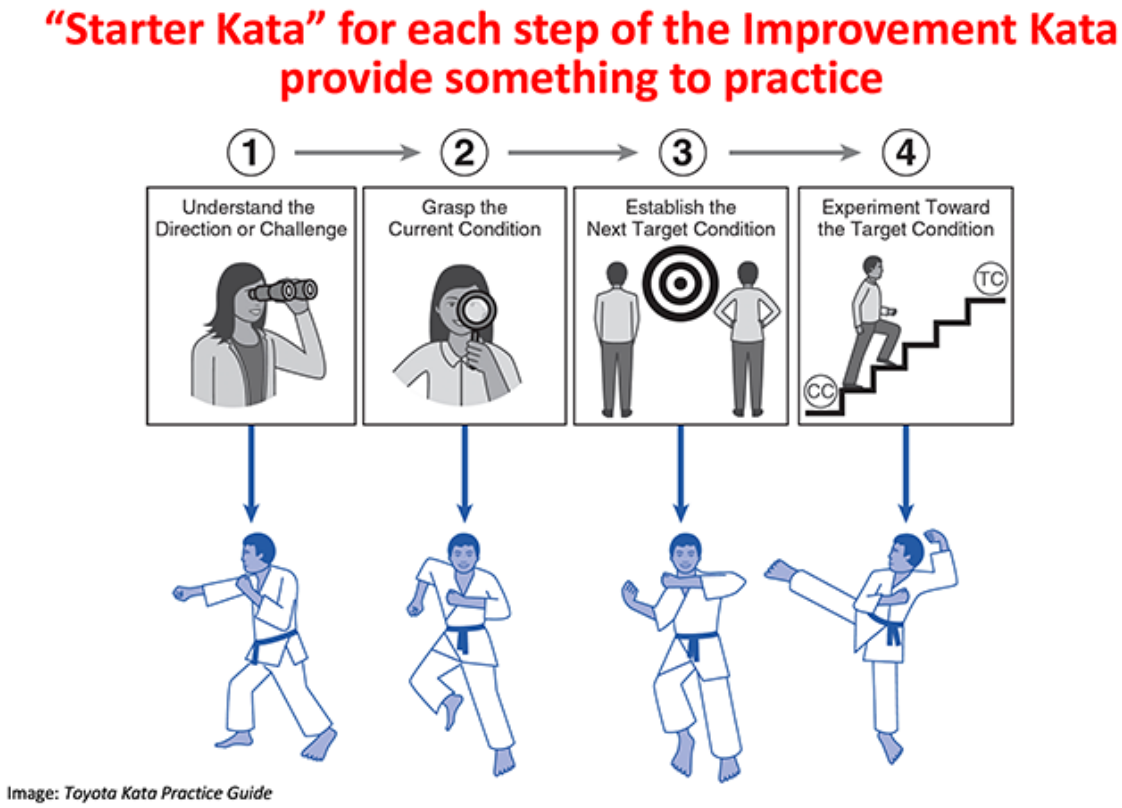


Image: *Toyota Kata Practice Guide*

In total, the Improvement Kata starts with a clear purpose in the form of a measurable challenge, and then we *iteratively* learn our way to the challenge. The starting assumption is that we do not know how we will get to the challenge because there is too much uncertainty so we have to step our way through it

experiment by experiment, adjusting and learning as we go. Not knowing, accepting uncertainty, recognizing that the future is not predictable, is uncomfortable for most of us. Therefore, we need to practice, ideally with a coach.

Now we all know the emphasis in Toyota is on learning by doing. Toyota values theory, but as a basis for developing practice through experimenting. To make this pattern gel in our minds we need enough practice so it creates strong neural pathways. We also know that there is a limit to how much new input our brains can absorb in one session, and it's less than you might think. Twenty minutes seems to be about right. Practicing for short periods of time daily for several months is much more impactful than morning to night sessions that we might have in an executive immersion training course or in a one-week kaizen event.

> *The emphasis in Toyota is on learning by doing. Theory on its own is not highly valued.*

Neuroscientists have demonstrated that behavior and thinking are interconnected (see Figure 3). When we do something, that gets encoded as a bundle of neurons and synapses that connect the neurons. When we practice in that way we get a very efficient circuit that becomes our habit. So for example, if we approach a problem through fast thinking, jumping to conclusions, we are more likely to approach problems that way in the future. To counter that tendency we need to repeatedly behave scientifically which will change how we think and make it more likely we will approach problems that way in the future.

Figure 3: Scientific Mindset and Scientific Behavior

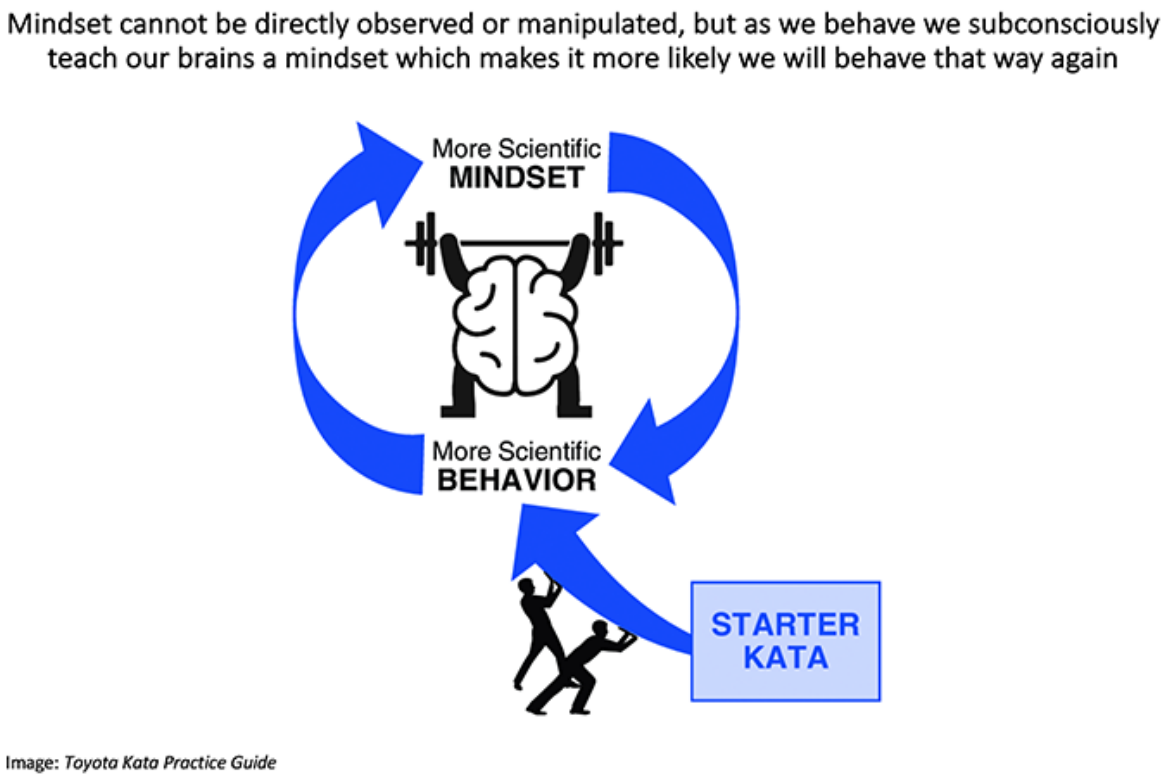


Image: *Toyota Kata Practice Guide*

Creating a Natural and Unscripted Improvement Routine

When you put this all together you get the Improvement Kata model and its associated practice routines, done in a coach-learner relationship. Toyota seems to do it naturally without a lot or scripting of how the coach teaches the student. Mike has made it explicit and more structured in Toyota Kata to help those of us who are not already in a mature organization with a culture of scientific thinking.

Does this mean that Toyota Kata now replaces the Toyota Way since scientific thinking is at the center? Certainly not. The 4Ps of the Toyota way reflect a management system that is more than individual people thinking scientifically. It starts with a collective clarity of purpose and core values that guide the overall enterprise. What is the organization's purpose? What is the collective vision for how we want the enterprise to operate? This must be lived and modeled by all managers becoming the guiding force of the culture.

The Toyota Way starts with a collective clarity of purpose and core values that guide the overall enterprise.

Philosopy does not emerge from experiments but needs to be carefully thought through and embraced to help provide direction to specific improvement efforts. There is a body of knowledge about lean processes and moving toward one-piece flow that will not automatically be discovered because we experiment a lot within a mass production system. We need to develop people in many ways besides scientific thinking to get to the leadership and culture we desire. Problem-solving is best done with a scientific mindset, and also includes ways to align goals (hoshin kanri) toward a clear strategy for the products and services of the firm.

Practicing scientific thinking will not make all these things happen automatically, but approaching all 4Ps scientifically brings all these elements of the system to life. Thus, I put it in the center of the new model.

We should also recall that Mike calls these “starter kata” rather than “finishing kata.” They are not intended to develop a master, but rather give something for the student to practice to get them started toward greater scientific thinking.

Perhaps we can view the kata as a catalyst that juices scientific thinking which is the engine that drives The Toyota Way. Without it, or some equivalent way of developing people to think scientifically, the Toyota Way might remain at the level of principles without practice.

Keywords:

The Toyota Way, Toyota Kata, Improvement Kata, Continuous Improvement, Leadership, Toyota Production System/TPS, Jeffrey Liker, Mike Rother