

Toyota Kata

Mobilizing our ingenuity
through good management

by Mike Rother
2011

v 14.2

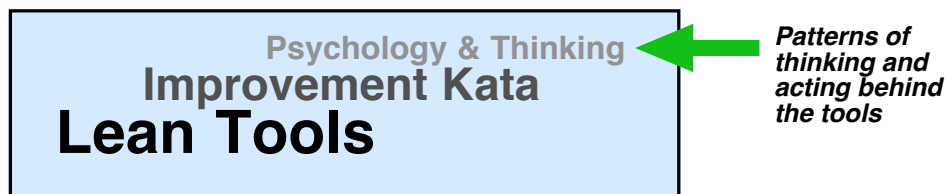
Objective:

- Illuminate changes emerging in business
- Understand what to do as leaders and managers
- Influence how you view your job as a leader or manager

Entire document copyright © 2011 Mike Rother, all rights reserved.
1217 Baldwin Avenue / Ann Arbor, MI 48104 USA / tel: (734) 665-5411 / mrother@umich.edu

FOCUS OF THIS PRESENTATION

This presentation is about the psychology and thinking
between the lines of the *Toyota Kata* book



I would like to...

- Exchange some findings, hypotheses and ideas
- End with more questions than when we started
- Give us some things to think about

THE QUESTION UNDERLYING THIS PRESENTATION

How can a company stay adaptive and innovative?



WHAT IS A MANAGER'S JOB?

THE SITUATION & ITS IMPLICATION

Many marketplaces are getting more crowded and dynamic.
Isolation from global competition is becoming rare.

- Conditions are always changing
- It is impossible to know how they will develop
- If you fall behind it can be difficult to catch up

The implication:

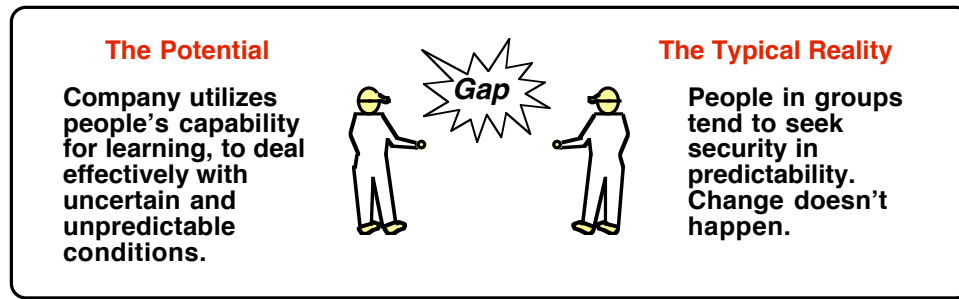
If we wish for our company to thrive...

- Then how it interacts with these conditions, both inside and outside the company, is important.
- Achieving continuous improvement throughout the organization is important.

WE ARE EQUIPPED TO DEAL WITH THESE CONDITIONS

The good news: Our human capability for learning allows us to improve, innovate, create and adapt.

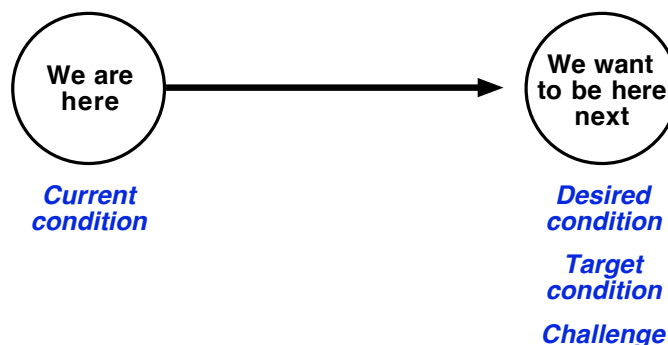
The rest of the story: *Only if you lead and manage your people in a way that taps, develops and utilizes that capability.* The capability tends to be latent in organizations.



For example, the “learning organization” concept makes sense to many leaders, but has been tough to successfully operationalize

THE TOYOTA KATA DEFINITION OF *MANAGEMENT*

*The systematic pursuit of desired conditions
by utilizing human capabilities
in a concerted way*



THIS IS ABOUT MOBILIZING INGENUITY IN AN ORGANIZATION

Ingenuity = Creating a way of doing something that we want but cannot yet do.

The challenge can be anything:

- ☐ An assembly operator and team leader want to find a way to drive screws without cross-threading
- ☐ We want to operate an assembly cell with four instead of six operators (at the same output)
- ☐ We want to injection mold parts in lot sizes that are 50% smaller
- ☐ We want to develop an electric car that goes 250 miles on a single charge

- How do we tap our ingenuity in organizations?
- How do we mobilize and channel it?

HOW HAVE WE BEEN APPROACHING IT?

Leaders and managers have tended to focus on outcomes and solutions

A lean solution at Toyota...



...is copied at a U.S. company



Focusing on outcomes is a kind of *implementation orientation*, which assumes the path to the desired condition is relatively clear. With that thinking, management's task is:

- Establish targets
- Describe solutions and tools
- Provide incentives to get it done
- Get out of the way and periodically check results

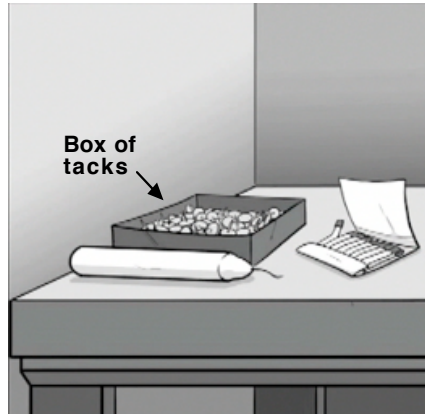
"Management by Results"

Parts were in line, now kitted. Which is correct?

BUT HOW WELL DOES FOCUSING ON OUTCOMES WORK?

The candle problem

Find a way to attach the candle to the wall so wax will not drip on the floor



Incentive: Group B is told they will receive a cash bonus if they solve the problem faster than the average of persons in Group A.

Experiments by psychologists Kark Dunker and Sam Glucksberg

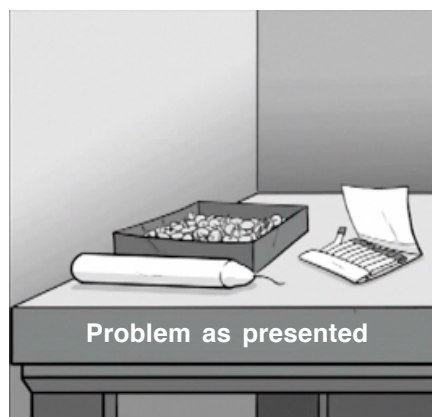
© Mike Rother

TOYOTA KATA

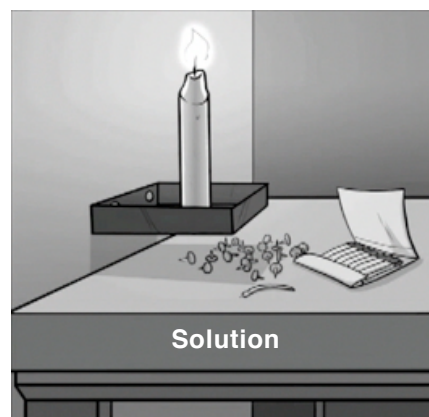
9

THE SOLUTION AND RESULT

Find a way to attach the candle to the wall so wax will not drip on the floor



Problem as presented



Solution

Result? The members of Group B (the group with the incentive) take three and a half minutes longer on average to solve the problem.

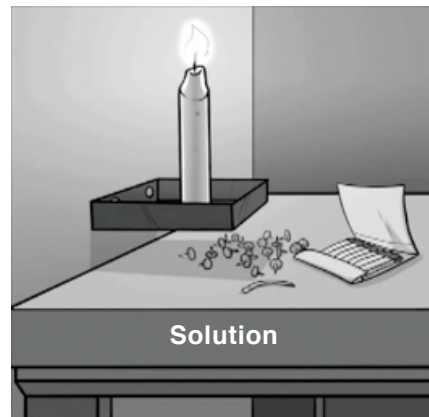
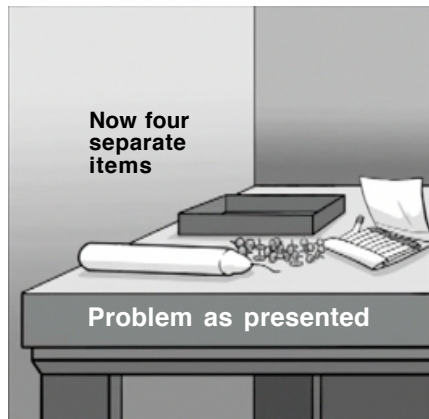
© Mike Rother

TOYOTA KATA

10

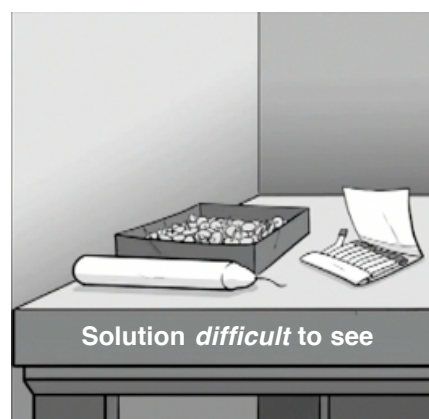
ROUND TWO

Find a way to attach the candle to the wall so wax will not drip on the floor



When the candle problem is presented this simpler way, the members of Group B (the group with the incentive) do complete the task faster than the average in Group A.

FOCUSING ON OUTCOMES WORKS WHEN THE PATH IS CLEAR



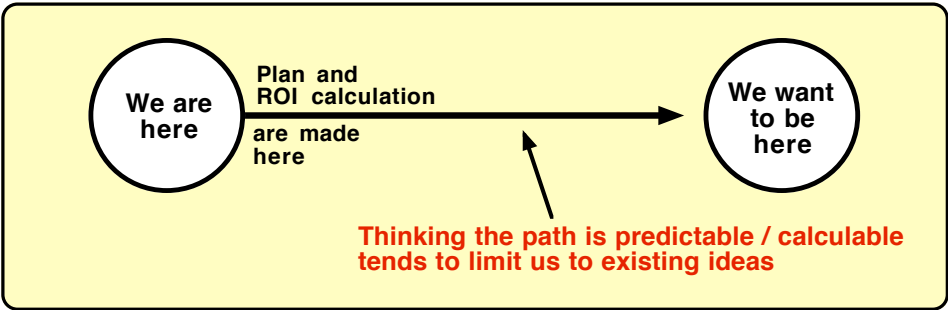
Behavioral scientists have shown repeatedly that extrinsic motivators work for tasks where the path is clear, but not for challenging problems that require creativity and adaptiveness (ingenuity) to solve.

Those kinds of challenges are now increasingly common

OUR PRESENT MANAGEMENT APPROACH MAY NOT BE WELL SUITED TO SUCH CHALLENGES

Many problems and challenges we face today lie beyond our current horizon, knowledge and ability. The path is unpredictable.

There are several as yet unknown ways to achieve a challenging goal. When we take a step forward we discover things, obstacles and ideas, that were not apparent when we were calculating and planning.



However, leaders and managers at many companies are still practicing routines like *management by results* (set targets, provide incentives, check results) and *ROI decision making*, which focus more on outcomes than on the process that generates outcomes.

EXAMPLE OF IMPLEMENTATION ORIENTATION

Action-Item Lists

Plan d'action				
Ligne 3		Date		
Problème rencontré	Solution proposée	Qui	Quand	Status
Bojots usagés station 25 (NR2)	→ Acheter outillage → Acheter programme → Acheter chaque des parties	R.R. S.G.	6/3 TBD 6/15/15	à réaliser
Problème station 25 (NR2)	→ Acheter Gel et 12	R.R.	6/3	à réaliser
→ Station 25 technique système (NR2)	→ Mail programme → Acheter cycle → 12, mail et 125 125 (NR2)	S.G.	TBD 6/03	
→ Bojots usagés, at 11 (NR2)				
→ Top de cycle at 24 (NR2) (NR2)	Acheter cycle Subje système de charge	S.G.	1/3 TDD	
→ Problème circuit de charge at 24 (NR2) (NR2)				
→ Station 25 → chargement système → Gel → programme			NR13 Atk →	
→ St 25 high chloride discharge	Analyse problème			
→ S.R. Bojots Gamme	Programme réduction Gendron	NR13	S.G.	
→ S.R. 25 Station 25	Cher conseil système pin	NR13		
→ S.R. 25 Bojots plate	Analyse cause	NR13 NR13 NR13		

**Such lists and plans
= deciding in advance
how we will get there.**

Yet the situation changes as we move forward!

So we are not experimenting and learning.

**This is not an effective way
of tapping our ingenuity**

DEVELOPING SOLUTIONS

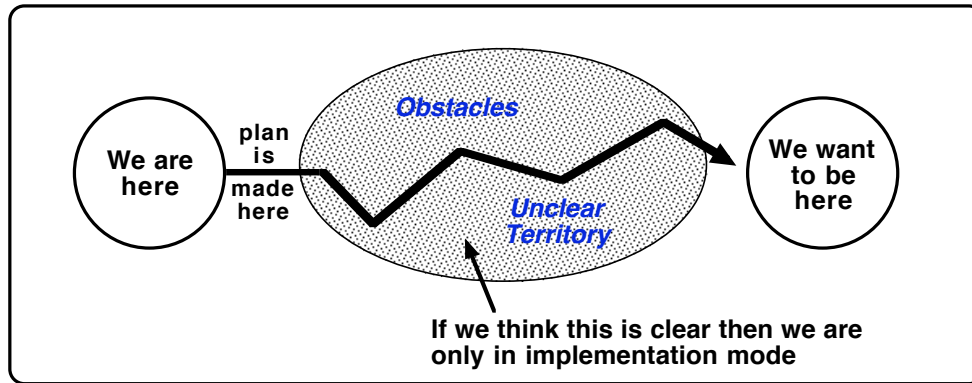
We do not know in advance what all the steps will be that will get us to the next desired condition. Like landing an airplane from 30,000 feet altitude.

There are only three things we can and need to know with certainty:

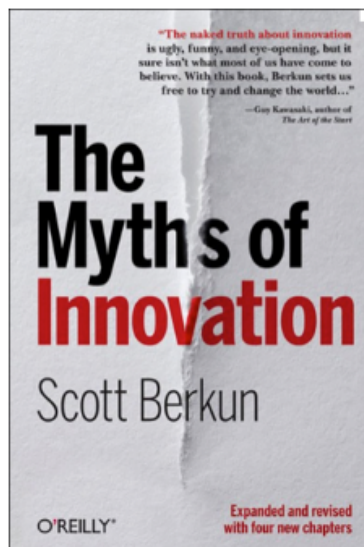
- (1) **Where we are**
- (2) **Where we want to be**
- (3) **By what means** we should maneuver the unclear territory between here and there.

“Management by Means”

Eisenach
Flashlight



HOW DO IMPROVEMENT, ADAPTATION AND SOLUTIONS HAPPEN?



“There is no singular magic moment; instead there are many smaller insights accumulated over time.”

“Big thoughts are fun to romanticize, but it's many small insights coming together that bring big ideas into the world.”

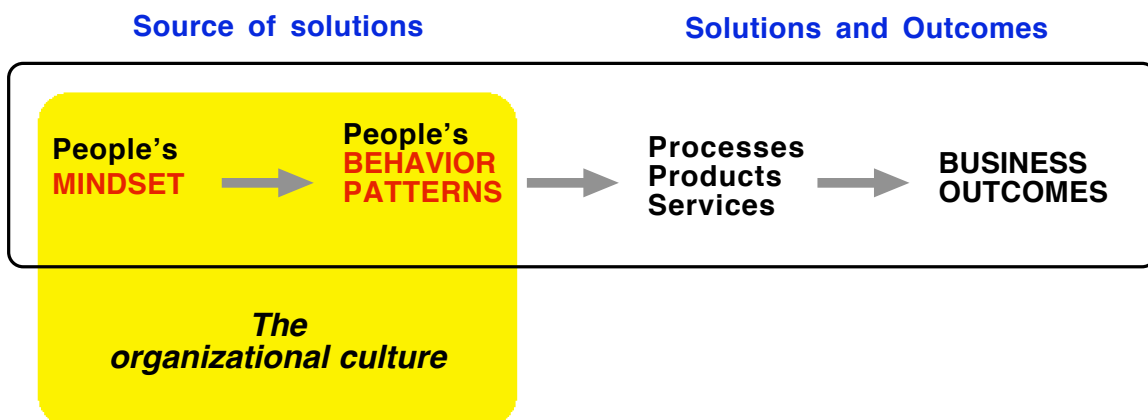
WHERE DOES SUSTAINED COMPETITIVE ADVANTAGE COME FROM?

Targets and results are vital, of course, but when management focuses primarily on outcomes and solutions it does not make an organization adaptive and continuously improving. Why?

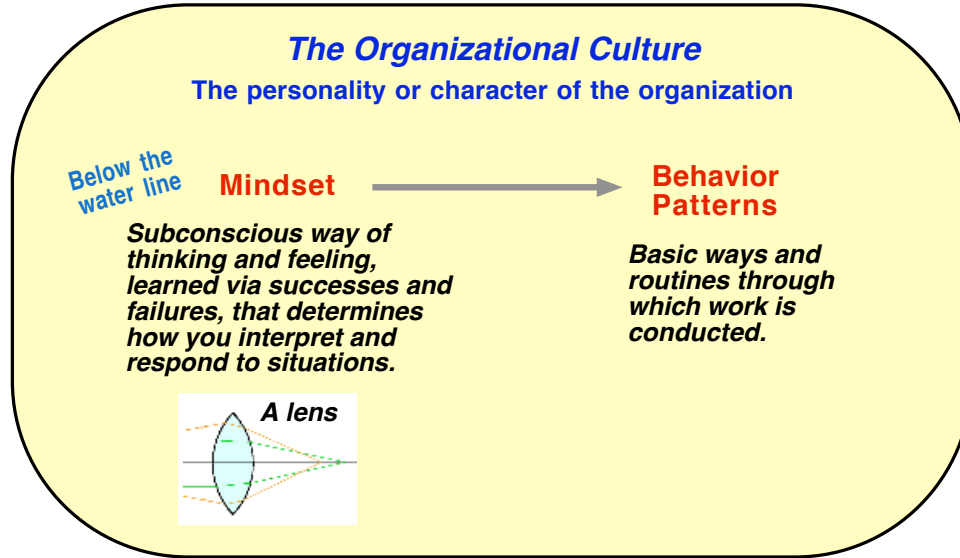
- Solutions that suit today's problems may not remain suitable for tomorrow's challenges.
- So it is not the solutions themselves that provide sustained competitive advantage.

It is the ability of the organization's members to understand conditions and develop fitting solutions, again and again.

WHERE DO AN ORGANIZATION'S SOLUTIONS COME FROM?



MINDSET FORMS THE BASIS OF ORGANIZATIONAL CULTURE



**Mindset is habitual and occupies real estate in the brain.
Changing the organizational culture will require changing mindset**

LET'S LOOK AT TWO DIFFERENT MINDSETS



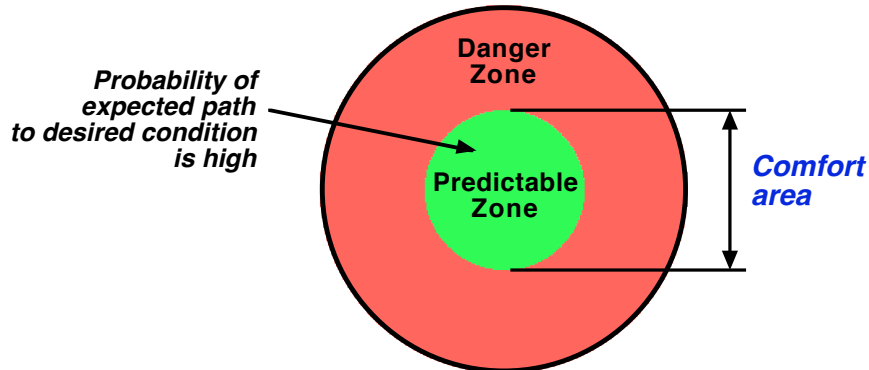
A FIXED MINDSET *

We derive a lot of our sense of security and confidence from predictability. We tend to seek certainty.

The way our brain functions, we naturally strive to operate in a “predictable zone”, where things are as expected, rational, calculable, logical, familiar and certain.

In the predictable zone:

- We expect that things will go as planned
- We feel we have control and can predict



And many things should be as predictable as possible!
Like the beam holding up the roof, or serving the customer.

*Terminology by Carol Dweck, Mindset (Random House, 2006)

© Mike Rother

TOYOTA KATA

21

BUT TRYING TO MAKE EVERYTHING PREDICTABLE IS A DEAD END. WHY?



It means you are deciding, planning and acting
based only on current perceptions

© Mike Rother

TOYOTA KATA

22

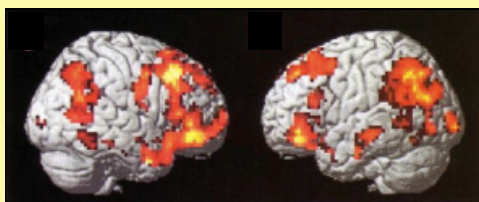
#1: WHAT IS AHEAD OF US CANNOT BE MADE PREDICTABLE

We can see only part way down the path to a goal



#2: THE SPECIAL CAPABILITIES OF OUR BRAIN GET ENGAGED WHEN WE LEARN NEW THINGS

Learning presupposes unpredictability; that we *don't* know



fMRI brain scan
of a person in a
**Challenging
Situation**

This brain is actively
engaged in wiring
circuits



fMRI brain scan
of a person in a
**Predictable
Situation**

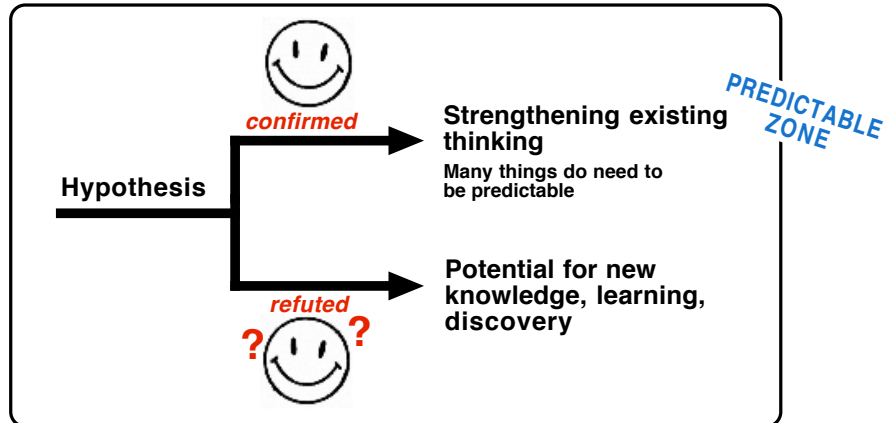
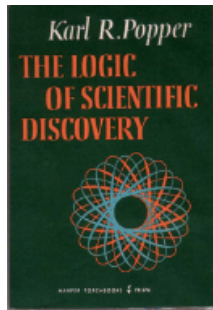
This brain is coasting
on memory you
already have
(which uses less
energy)

fMRI Scans of brain activity by Dr. Gerald Hüther
Presented at *Production Systems 2009* Conference, Munich, May 2009

#3: WE ADVANCE TO NEW SOLUTIONS AND LEVELS OF PERFORMANCE THROUGH *DISPROOF*

When things are *not* as expected

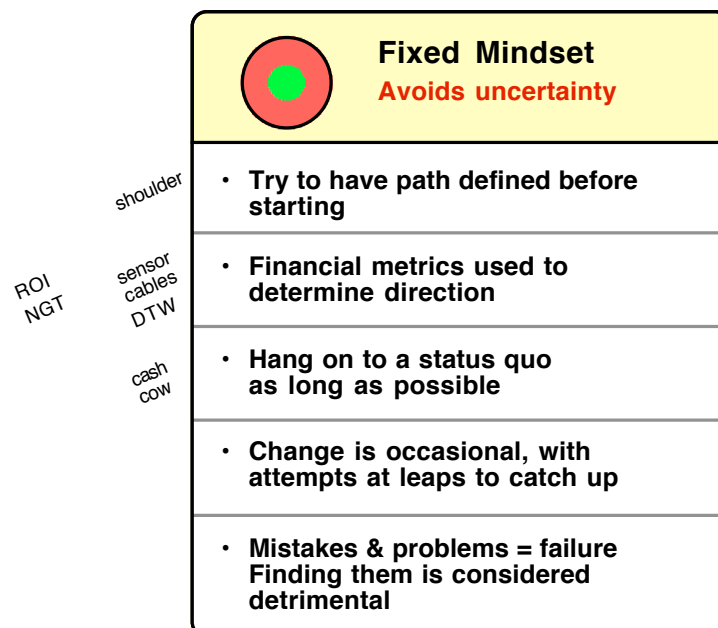
The Scientific Method or *Failure is Data*



When a hypothesis is refuted this is in particular when we can gain new insight that helps us reach new performance levels.

WHAT KINDS OF BEHAVIORS DOES A FIXED MINDSET GENERATE?

👉 With a fixed mindset, the response to uncertainty is to try to make things predictable; even artificially.



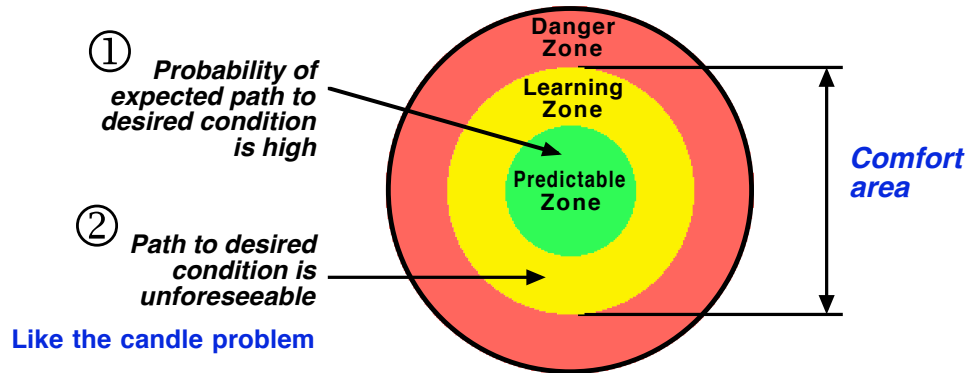
AN ADAPTIVE MINDSET

With this mindset you operate in two zones simultaneously:

The Predictable Zone + a Learning Zone

In the learning zone:



- There is a dilemma: We are not sure how things will go
- There are unanticipated obstacles
- You acquire/increase your knowledge as you go



WHAT KINDS OF BEHAVIORS DOES AN ADAPTIVE MINDSET GENERATE?

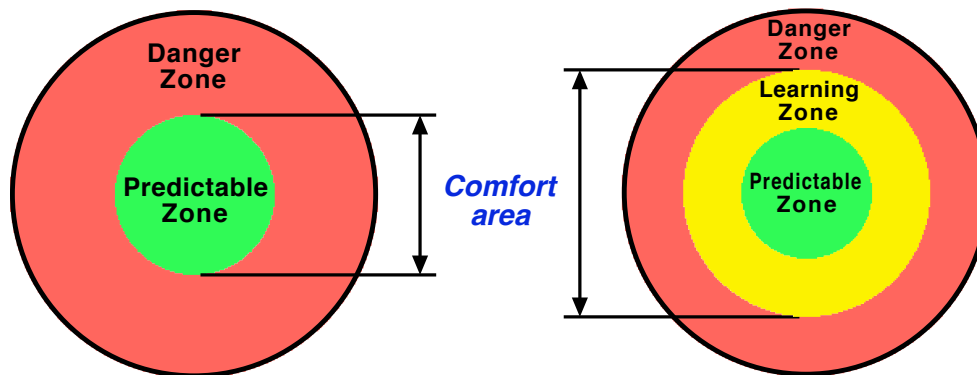


With an adaptive mindset, the response to uncertainty is to acknowledge unpredictability and work through it

 Fixed Mindset Avoids uncertainty	 Adaptive Mindset Accepts uncertainty
• Try to have path defined before starting	• Plan is made, but actual path is determined along the way
• Financial metrics used to determine direction	• Financial metrics used to determine where refinement is needed
• Hang on to a status quo as long as possible	• Working toward a long-term goal (thinking beyond the familiar, toward a vision)
• Change is occasional, with attempts at leaps to catch up	• Change is frequent and normal, typically in small steps
• Mistakes & problems = failure Finding them is considered detrimental	• Mistakes & problems = normal Finding them is considered useful for learning (on a small scale!)

WHICH ORGANIZATION IS MORE LIKELY TO:

- a) Execute successfully?
- b) Adapt, innovate and survive long term?



The objective is not to avoid unpredictability or to try to make everything predictable.

That's ultimately a losing strategy.

The idea is to have a means for dealing effectively with the unpredictability with which you are confronted; in order to grow more comfortable with the Learning Zone.

HOW DO YOU CHANGE OR DEVELOP MINDSET? (AND THE ORGANIZATIONAL CULTURE)



Psychology and brain research are clear: **Mindset can be changed.**

Neuroscience shows that our thinking and skills are more transformable than we thought. The way neurons function equips us for learning new patterns and habits. The brain has plasticity.

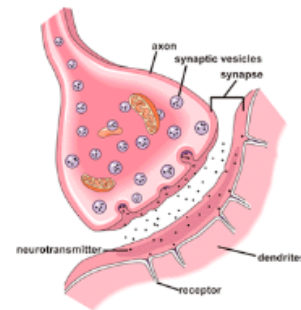
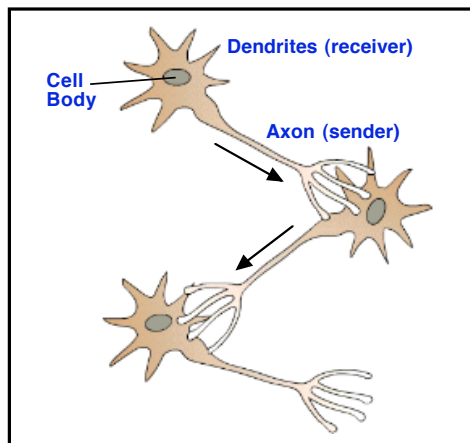
MINDSET = NEURAL PATHWAYS OR CIRCUITS

It's physiological

The human brain is estimated to contain 100 billion neurons. Neurons form circuits within the brain, which underlie perception and thought.

For communication between two neurons to take place, an electrical impulse travels down an axon to a synapse, or gap, where transmission occurs. The gap is what allows plasticity.

Both the strength of connection between neurons (ease of information transmission) and the number of connections increase with use. Whatever you focus on or practice weaves a habit or pattern in your thinking.



"Neurons that fire together wire together."

- Carla Shatz

"Every time you do something, you are more likely to do it again."

- Alvaro Pascual-Leone

© Mike Rother

TOYOTA KATA

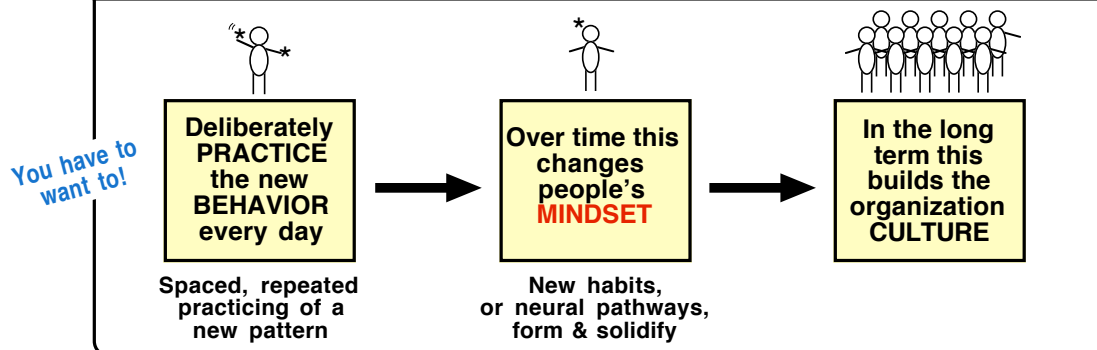
31

PRACTICING NEW BEHAVIOR CREATES NEW MINDSET

Mindset isn't changed directly. Mindset is not developed by incentives, benchmarking other companies, episodic classroom training or workshops (*declarative memory*).

Brain research: Two main mechanisms are mirroring the behavior of others, and repeated physical practicing (*procedural memory*). Repeated physical experiences, with associated emotions, produce mindset.

"New experiences are required to change our mind" - Professor Gerald Hüther



Note that the research findings do not say, change how you think and *then* apply a different behavior pattern. They say, change how you think *by* applying a different behavior pattern.

© Mike Rother

TOYOTA KATA

32

BUT THERE IS AN IRONY

How can we get more comfortable with the unpredictable learning zone?

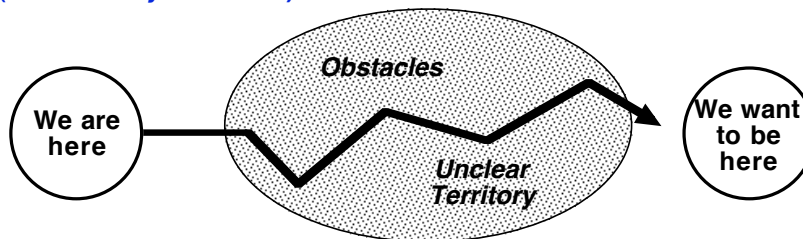
- (A) We favor existing neural pathways (*the brain likes to run on automatic*)

We naturally and reflexively prefer routine, familiar activity in the predictable zone. It uses long-standing neural circuits, which were developed via past experiences and require less energy to function.

- (B) Meeting challenges means using other neural pathways

The measures required to deal with new situations, develop new solutions and reach new levels of performance are not predictable. Pursuing them activates other neural pathways which consume more energy. So we resist letting go of something familiar.

(*"Uncertainty aversion"*)



The learning zone involves discomfort. It's as if the way our minds operate prevents us from improving, adapting and innovating!

A Solution:

COMFORT COMES WITH PRACTICE

We can utilize the fact that we tend to rely on well-worn mental circuits, i.e., that discomfort decreases with practice.

The trick is to develop well-worn mental circuits not for solutions, but for a *means* by which we deal with dynamic, uncertain conditions.

---> *Make a habit out of a content-free way of dealing with uncertainty*

This is like training in sports: To prepare for contests with unpredictable solutions, the focus of the training is not solutions, but how to play.



People can work iteratively, adjust and adapt... if they know what's going on; if they have practiced and learned a way of doing that.



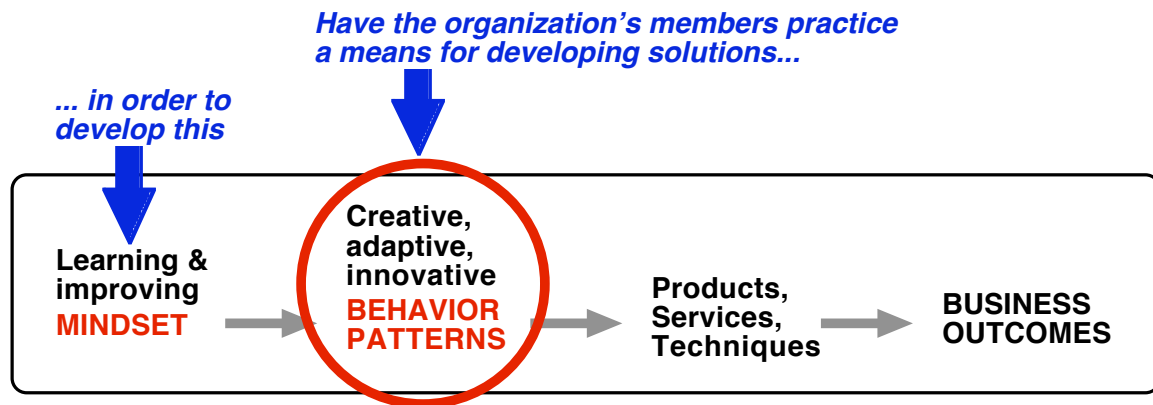
This concept is the basis of the book *Toyota Kata*

WHAT IS MANAGEMENT'S TASK?

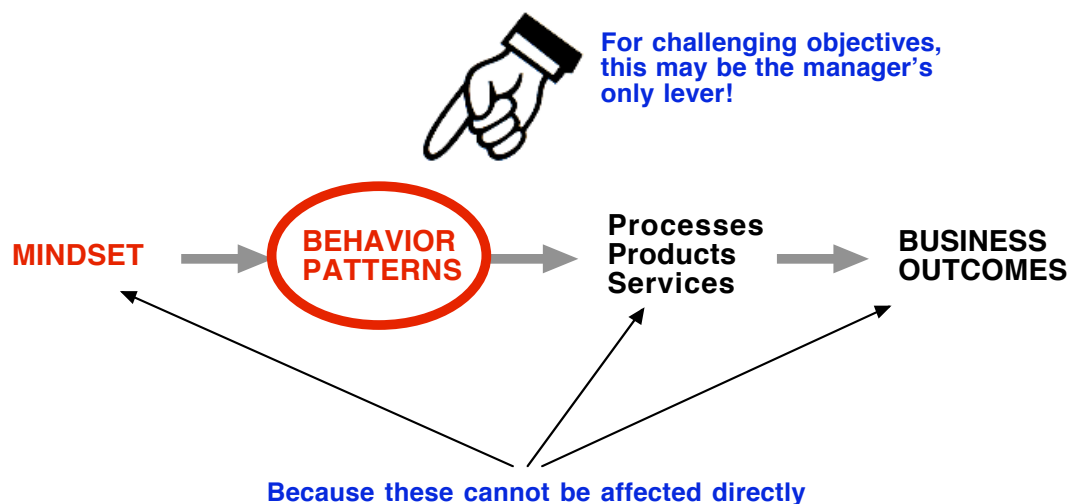
If we cannot specify solutions, then what can we give the organization's members? What should managers and leaders do to create an adaptive, innovative organization?

A leader doesn't know what steps will get us to a challenging target condition, but s/he can specify by what means we should get there.

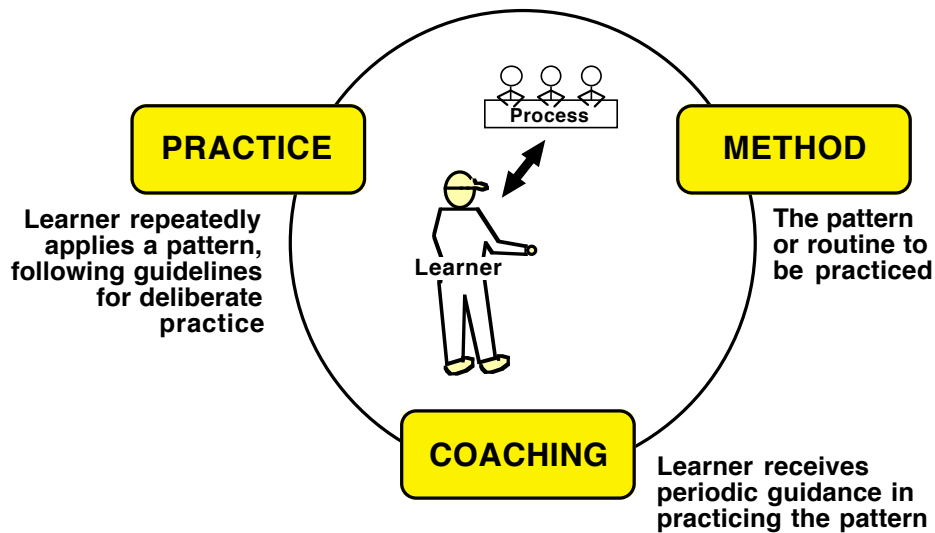
The manager's task is to have the organization's members practice and learn a behavior pattern -- a method -- that is effective for moving through the unclear territory of the learning zone.



THE ABILITY TO HAVE AN EFFECT ON OURSELVES IS HERE



INGREDIENTS FOR CHANGING MINDSET AND CULTURE*



Notice that in order to practice, you need to know what to practice

*Model based on the work of Alfred Binet (1857-1911), who felt intelligence is malleable rather than fixed

© Mike Rother

TOYOTA KATA

37

A new lesson for leaders: BEHAVIORIST & HUMANIST APPROACHES WON'T WORK FOR CHANGING ORGANIZATIONAL CULTURE

We have been aware of the human potential in our organizations for decades, and have gone through many management concepts that sought to tap it. Generally these fall into two categories:

- Behaviorist (carrot & stick incentives)
- Humanist (autonomy & self-actualization)

Lessons from brain research are showing us that these approaches alone will not work for changing an organization's culture. Why?

Our existing neural pathways, which constitute our current habits, or patterns, of thinking and problem solving, automatically continue to predominate unless we deliberately practice and learn a different pattern.

The attractive concept of managers "unleashing" people's creativity by "inspiring" and "encouraging" them is probably incorrect.

In organizations it will take more active leadership, management and practice to develop and mobilize that capability.

© Mike Rother

TOYOTA KATA

38

A NEW CONSIDERATION FOR LEADERSHIP AND MANAGEMENT

The desired behavior pattern should be specified

To change mindset and culture through practice, an organization's leaders should specify the pattern that is to be practiced.

That's what Toyota does.

	<i>Solution</i>	<i>How to develop solutions</i>
<i>Toyota's Management System</i>	Left open	Specified - guided and directed
<i>Our Management System</i>	Given / Directed	Not specified - left to employee

In Japan such patterns to practice are called *kata*

Pattern *Form* **KATA** *Method* *Routine*

Kata originally were movement sequences in the martial arts. Some common translations or definitions of the word kata are:

- *A way of doing something*
- *A pattern, form, routine or method*
- *A training drill*

A kata is a routine or pattern that is deliberately practiced to become second nature. This is done to learn a desired skill and mindset.

This is exactly what we are talking about in saying that management's task is to have the organization members practice a specified method or behavior routine. By persistent and regular teaching at all levels in the organization, the routine becomes part of the embedded culture.

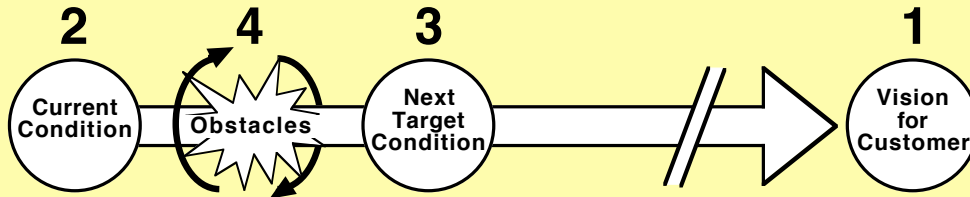
Upon close inspection Toyota's management approach is characterized by a pattern that is taught to all organization members and repeated over and over in daily work.

I call that method the **improvement kata**
The **improvement kata** is a backbone practice
of a lean organization

THE IMPROVEMENT KATA

The improvement kata is a basic pattern for improving, based on a four-part model

- 1 In consideration of a vision or direction...
- 2 Grasp the current condition.
- 3 Define the next target condition.
- 4 Move toward that target condition with PDCA, which uncovers obstacles that need to be worked on.



The improvement kata is a way of achieving things that you don't know how you are going to achieve

Teams using the improvement kata learn as they strive to reach an objective, and adapt based on what they are learning

THE IMPROVEMENT KATA IS CONTENT FREE

It has to be, since we don't know what's coming

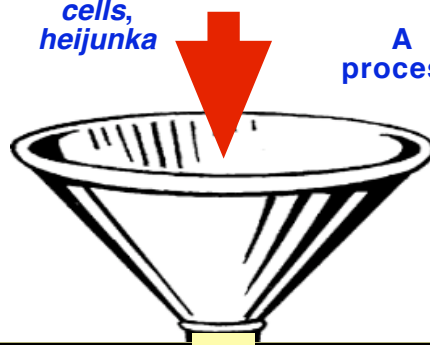


Lean tools
like *kanban*,
cells,
heijunka

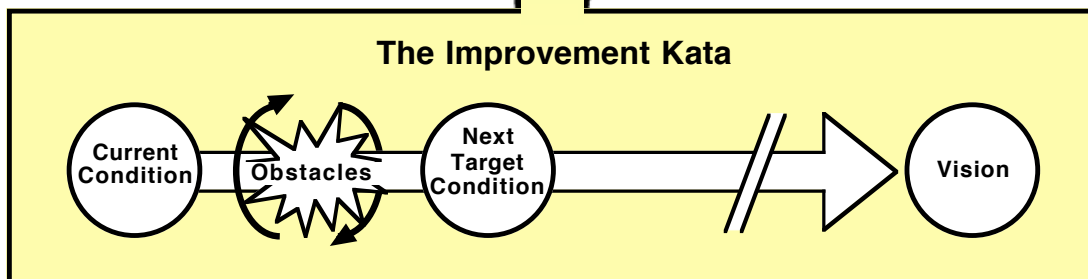
A
problem

Any
objective

A
process



The Improvement Kata



LEARNING A SKILL VIA PRACTICE

The Dreyfus Model of Skill Acquisition

Stage	Characteristics	Standard of Work	Autonomy
Novice	Adherence to rules or plans Little situational perception No discretionary judgement	Unlikely to be satisfactory unless closely supervised	Needs close supervision or instruction
Advanced Beginner	Action based on attributes or aspects Situational perception still limited All aspects are given equal importance	Straightforward tasks likely to be completed to an acceptable standard	Able to achieve some steps using own judgement, but supervision needed for overall task
Competent	Copes with crowdedness Sees actions partially in terms of LT goals Has standardized and routinized procedures	Fit for purpose, though may lack refinement	Able to achieve most tasks using own judgement
Proficient	Sees what is most important in a situation Perceives deviations from the normal pattern Maxims vary according to situation	Fully acceptable standard achieved routinely	Able to take full responsibility for own work, and coach others
Expert	No longer relies on rules / guidelines / maxims Grasp of situations & decision making intuitive Vision of what is possible	Excellence achieved with relative ease	Able to take responsibility for going beyond existing standards and creating own interpretations

Adapted from: Dreyfus, Stuart E., *Formal Models vs. Human Situational Understanding: Inherent Limitations on the Modelling of Business Expertise*, University of California, Berkeley, 1981

© Mike Rother

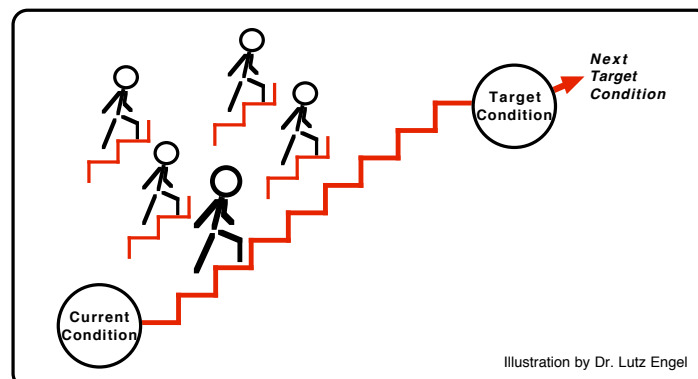
TOYOTA KATA

43

DEVELOPING ORGANIZATION CAPABILITY AND COMPETITIVE ADVANTAGE

The more people in your organization who get to higher skill levels with the improvement kata:

- The more challenges your organization can take on
- The bigger the challenges it can take on
- The more knowledge it can build
- The faster it can move ahead.



© Mike Rother

TOYOTA KATA

44

In conclusion:
**HOW ARE YOU THINKING ABOUT
 INNOVATION, CREATIVITY AND ADAPTIVENESS?**

	<i>Innovation</i>	<i>Creativity</i>	<i>Adaptiveness</i>
Old Way	New solutions & levels of performance that come from: <ul style="list-style-type: none"> • Periodic leaps • Some individuals <i>Emphasis on the end product</i>	An inherent trait or characteristic of some individuals	Reaction to changes in surrounding conditions Waiting for change

What is management's task in this case?

In this way of thinking, innovation, creativity and adaptiveness are only periodic and done by only a few people. They are not part of daily management and...

Not the manager's job.

A DIFFERENT WAY OF THINKING

	<i>Innovation</i>	<i>Creativity</i>	<i>Adaptiveness</i>
Old Way	New solutions & levels of performance that come from: <ul style="list-style-type: none"> • Periodic leaps • Some individuals <i>Emphasis is on the end product</i>	An inherent trait or characteristic of some individuals	Reaction to changes in surrounding conditions Waiting for change
New Way	New solutions & levels of performance that come from: <ul style="list-style-type: none"> • Many iterative cycles, pointed toward a vision and conducted with special focus and energy <i>Emphasis on the process</i>	Product of a mindset and way of working, which most people can learn through practice	Overcoming obstacles that are encountered while striving to reach a desired new condition. (That condition may be a small change.) Confronting change

What is management's task in this case?

Just by changing three definitions, it is the manager's job. Every day.



THE DOOR IS OPEN

To a new way of managing

Our thinking and skills are more transformable than we thought. This opens the door to a style of management different from traditional command & control.



In the traditional way of managing we tend to look for people with certain skills built in and then give them outcome targets. In the alternate management style you develop the desired work habits through practice after a person is hired.

Combine findings about neuroplasticity + realization that improvement, adaptation and positive results tend to arise from accumulation of small steps across the organization, and suddenly it starts making great sense for everyone in an organization to learn an improvement kata and participate.

Achieving significant new outcomes involves many successive target conditions and lots of PDCA. We like to talk about our outcomes, our inventions, but the day-to-day enterprise of all the steps that get us there -- a little here, a little there -- is where we humans actually spend the majority of our time; it's where we live.

So this is not about a respect for people in order to be nice. It's a kind of respect for people -- for developing and using everyone's capabilities -- that may be necessary in order for us to collectively achieve what we need to achieve!

To get people across an organization to systematically work on improvement every day requires teaching the skills behind the solution. And for that to happen, their leaders and managers will also need to practice and learn those skills.

A DIFFERENT MANAGEMENT TASK

In this management approach, the job of leaders and managers is not to get the results, but to create the underlying system and develop people, so that results can be achieved.

Traditional Management Focus on solutions	New-Style Management Focus on the way solutions are developed
<ul style="list-style-type: none"> • Establish targets • Describe solutions • Provide incentives • Periodically check results 	<ul style="list-style-type: none"> • Establish targets • Develop, via practice with coaching, the capability in people to develop new solutions... <p>...by having people practice a common way of working, like the improvement kata</p>

ALL MANAGERS ARE TEACHERS, AND THEIR ACTIONS DETERMINE COMPANY CAPABILITY

Whether consciously or not, with their everyday words and actions all managers are teaching their people a mindset and approach.

So leaders and managers should be mindful. *It makes sense to ask, “What patterns of behavior and thought do we want to be teaching in our organization?”*



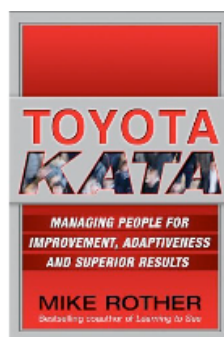
© Mike Rother

TOYOTA KATA

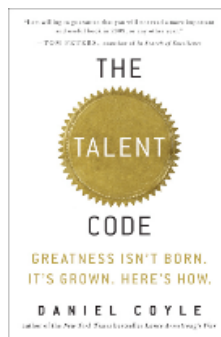
49

MORE INFORMATION

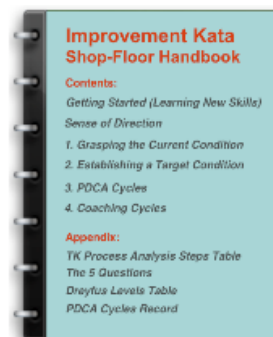
- ☐ Visit the [Toyota Kata Homepage](#)
- ☐ Read **Toyota Kata + The Talent Code**, and get a copy of the **Improvement Kata Shop-Floor Handbook**



+



+



© Mike Rother

TOYOTA KATA

50