

Brief Summary of Kanban from the inside

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Kanban is a set of 4 Foundational principles and 6 core practices.

4 Foundational Principles

- FP1 - Start with what you do now
- FP2 - Agree to pursue evolutionary change
- FP3 - Initially respect current processes, roles, responsibilities and job titles
- FP4 - Encourage acts of leadership at every level in the organization - from individual contributor to senior management

6 Core Practices

- CP1 - Visualise
- CP2 - Limit Work in Progress
- CP3 - Manage Flow
- CP4 - Make Policies explicit
- CP5 - Implement feedback loops
- CP6 - Improve collaboratively, evolve experimentally

Chapter 1 - Transparency

Three of its 6 Core Practices relate to it - CP1 – Visualize, CP4 - Make policies explicit and CP5 - Implement feedback loops

In Japanese Kanban is a “visual sign” or “token”

What goes in the Kanban Board

- which work is blocked (waiting on something)
- who is working on what
- what different types of work we have and in what proportions
- how much work we have at each stage of completion

CP1 - Visualisation and Change

With Kanban, the purpose of Visualisation and other forms of transparency is

- to make the need for action visible - action in the form of work that needs to be done, action in the form of changes to the system
- to help people make good choices - good choices in the selection of work, good choices in justifying and implementing change

Self-Organization doesn't just mean that individuals are able to act with autonomy - it also means that the system can reconfigure itself to meet its challenges more effectively

CP4 - Make Policies explicit

Many policies describe the qualities expected of work items as they enter or leave a column

- Items in the "Ready" column should require no more than 5 days of development - 5 day rule
- Items can't enter the "Test" column until they have passed peer review and demonstrated to the team

Or policies could be more global in nature

- Production stability takes priority over QA bug fixing - both take priority over new development
- when taking on a new piece of work, inform the sponsors if it is likely to have an impact on any existing work

Policies and Change

We add policies when we believe that the additional clarity will help us either to make better choices or to make them more efficiently. E.g.

- Larger work items are disproportionately likely to prove troublesome compared with smaller ones
- Generally speaking it is better to finish something than to start additional work (Stop starting, start finishing)

CP5 - Implement Feedback loops

Feedback loops are essential to making transparency an effective driver of change

3 common examples that create opportunities for different kinds of feedback

- The Stand-up meeting - Typically short enough that participants can stand for the duration of the meeting. Stand-up meeting can take a number of forms :
 - Informal, agenda less unstructured
 - interrogated by a manager
 - around the room person by person - perhaps using a Scrum format - just talk about the 3 questions
 - reviewing work items on the Kanban board - scanning it left to right - discussing items close to completion, or discussing only those that are blocked or at risk

There is a social and team building event (building trust) - during the stand up. Board driven formats keep reinforcing the idea that together we want to get work across that finish line

- Replenishment meetings - this is the forum where a process's input queue is populated with new work. It is also a great opportunity to gauge customer satisfaction to explore customer needs and match those needs with the capability of the team.
- Other meetings - These are the weekly or biweekly service delivery reviews or the System Capability reviews where teams share performance data, incident reports and improvement updates with each other, the customer and the wider organization

Feedback loops based on metrics

Cumulative Flow Diagrams - gives feedback about lead times through the process, delivery rates out of the process and the style of delivery etc.

Transparency as a Value

Transparency helps people make good choices about the day to day work - promotes self-organization and gives people the feedback that progress is being made.

Chapter 2 - Balance

CP2 - Limit WIP

- As work moves toward completion, the availability signs move upstream indicating that work can move forward into the vacated space as soon as they are ready.
- WIP limits are best seen not just as mere policy levers but *feedback mechanisms* and drivers of system wide improvement in their own right.
- When you reduce WIP, you make other problems much more apparent. More WIP - more people waiting for other people to finish - resulting in delays and multi-tasking

Ways to limit WIP

- Control batch size
- Control the number of things happening in parallel

Balance Urgency driven vs. Date Driven

- If we can safely deliver the urgency driven work ahead of the date driven work that's a win, but we will give priority to the date driven work as soon as believe that it is a risk.
- If we attach an arbitrary date to the urgency driven work, we might put the genuinely date driven work at risk. If we treat them both as urgency driven, we fail to manage the schedule risk properly.

Risk based categorization and Classes of Service

Kanban implementations typically recognizes four different classes of service

1. **Expedite** - work items so urgent that we will drop other work in order to give them immediate attention
2. **Date Driven or Fixed Date** - work items whose delay beyond a specific date will result in significant penalty being incurred, disproportionate to any benefit in delivering early

3. **Standard / Regular** - urgency driven work to be delivered in a customer agreed order or sequenced according to a system policy.
4. **Intangible** - capability improvements, experiments in technology or the market, investments in people - work that is essential over the medium term / long term but whose direct and immediate impact is hard to quantify

When categorizations are based on the need to offer different kinds of performance outcomes, we call them **Classes of Service**.

Balance Demand vs. Capability

- If you can balance demand vs. capability, you can help your customer make better informed choices.
- Work item categorizations and classes of service help you to manage to multiple time horizons simultaneously.

Stakeholder Balance

It is important to strike a balance between the needs of the customer, the stakeholders, the organization and the people doing the work. Improvements that do not respect this rule become unstuck.

Balance is a strange thing - we really enjoy it when it is there - but achieving it takes anticipation, vigilance, and effort. To bring balance in your application, try prefacing it with "Find ways to"

- Find ways to limit WIP
- Find ways to limit WIP at every organizational level

Chapter 3 - Collaboration

CP6 - Improve collaboratively, evolve experimentally

Examples of creative collaboration - Lennon and McCartney, Watson and Crick, Marie and Pierre Curie - collaborations that made a huge impact - where the whole is greater than sum of the parts

Collaboration between developers, reviewers, testers, Product development - essential to have a great product

Evolve experimentally

If improve collaboratively is about how change is driven, evolve experimentally is about how it is conducted. Kanban uses the Deming Cycle or Shewhart Cycle of PDCA

- Plan - plan an experiment based on hypothesis
- Do - Conduct the experiment
- Check - or study the results or outcome of the experiment
- Act - on the results changing either the hypothesis or the system and sharing appropriately

Chapter 4 - Customer Focus

CP3 - Manage flow seeking smoothness, timeliness and good economic outcomes, anticipating customer needs

Why Customer Focus

- Know what you are delivering, to whom and why
- Too often we find that we would deliver features that would never be used. Features that had been asked for
- No longer are we building to meet the requirements - but building to meet needs that are still to be discovered and explored. Not forever looking backward, justifying ourselves providing that we are building "correctly to specifications" but looking forward, working towards meeting needs that are still unfolding - we seek to find ways to capture learning more effectively.

Upstream Kanban is about organizing needs and developing ideas that are always good choices on offer when delivery capacity becomes available.

This design reinforces 2 concepts that the portfolio managers seem to forget

- We generate more ideas than we can possibly use. Over time, we will accumulate more ideas than we can usefully manage, let alone implement
- Ideas cannot proceed on their own merits alone - they are in competition with others. New ideas can enter the competition at any time.

Effectiveness upstream depends on the 3 values - - *Transparency, Balance and Collaboration*

In Customer focus, we look at

- Whose needs do we think are met by these ideas
- Are we meeting the needs fast enough
- What is the data telling us? What are people telling us
- What might lie behind those needs
- What needs might be going unmet
- How can we test that

In short, can we develop a better sense for what will be needed?

Anticipating needs:

It is important to move away from doing what is asked to reorienting the process towards discovering and meeting needs –

- shift from internal (what we think we know) to external (what is still out there to be discovered)
- shift from the past (what we have been told) to the future (when the customer's need will be met)

Plaque behind the Customer Service Desk of a Toyota Dealer - "*anticipating the mobility needs of people and society ahead of time*"

Chapter 5 - Flow

CP3 - Manage Flow

Daniel Mezick in his book Culture Game tells us that we have the capacity to pay explicit attention to only a limited number of things at once. Kanban is paying explicit attention to flow.

What does flow look like:

- You see a good number of work items advancing between stand up meetings
- you see a good number of items free of blocking issues giving you confidence that progress can be made
- You sense that work is finishing faster and more predictably.

Although it is good to be able to see and quantify flow, the importance of feel should not be underestimated. It feels good to have work items progressing, to have a workload that is not dominated by issues and make predictions with confidence.

Practices done at the workplace that have relationships to Kanban practices

1. Tracking work end to end and at the right work item granularity
2. controlling batch sizes with WIP limits and with policies on work item size
3. managing WIP across functional boundaries
4. visually managing dependencies on shared services
5. changing granularity of the activities or states through which work items are managed
6. Incrementally reorganizing the process
7. measuring and reporting performance in ways that are relevant to customers

Managing Flow for Timelines

Managing flow is not just for removing impediments - we would need to manage work proactively

- unusual risks and dependencies must be identified early and managed effectively
- In the medium term, anticipated workload must be met with adequate capacity
- In the longer term, entirely new capabilities may be needed

Chapter 6 - Leadership

FP4 - Leadership at every level.

Encourage acts of leadership at every level in your organization from individual contributor to senior management.

All the 6 Core practices is full of leadership opportunities.

- Transparency - In knowledge work, things don't make them visible or explicit by themselves - leaders choose to make them so.

- Balance - Questions like where are we overloaded and why - are our pain points obvious or does the volumes of work hide them? Is the mix of work right?
- Collaboration - Reaching out, sharing a problem and noticing how people interact
- Customer focus - it takes leadership to acknowledge that the process may be ineffective at discovering and meeting customer needs
- Flow - Questions like are you seeing it - what is stuck today - where do blockages repeatedly occur
- Leadership - encouraging leadership in others can demand real leadership on the part of the encourager. Kanban's kind of leadership not only spreads, it reinforces itself.

Transparency, balance and collaboration suggest a need for leaders who are committed to sustaining an environment in which opportunities for change are easily recognized and systematically followed through. With values of customer focus, flow and leadership, leaders make sure that change is carried out in the proper context with direction and purpose.

Chapter 7 - Understanding

FP1 - start with what you do now

The focus on what you do now is about keeping change anchored in present reality, both now and as it continues to develop. Understanding represents both the initial commitment and the ongoing discipline to maintain that anchor's hold.

Change without understanding - 3 Anti Patterns

Management thinkers have identified 3 anti patterns of management behaviour that belie a deficit of understanding which can lead to serious consequences.

1. Russel Ackoff bemoaned *complacency* - the sin of management inaction
2. Jim Collins in Good to Great warns against *bravado* - management recklessly taking for granted the organization's ability to change
3. Deming often spoke of *tampering* - a management tendency to address unpredictability in ways that actually makes it worse. Over reacting to variation or adjustments made in response to common cause variation that result in additional variation.

Beware of complacency, bravado and tampering - change that is too slow, too fast or too random.

By adopting Kanban, complacency is addressed - in making the need for change visible. To address the other 2 anti patterns, a good way to visualise is the J curve.

The J curve (Satir curve ?) traces the impact of change over time - its shape suggests 3 questions

1. Will we end up better off than we were at the start
2. Will we endure the transition? Is the intervening loss of performance, fitness etc sustainable?
3. Do we have the patience? How much time can pass before the urge to abandon the journey will be irresistible?

A Pattern for Purposeful change

FP1 - Start with what you do now, understanding

- ✓ the purpose of the system
- ✓ how it serves the customer
- ✓ how it works for those inside the system
- ✓ how it leaves customers dissatisfied and workers frustrated
- ✓ how it can be changed safely

Chapter 8 - Agreement

FP2 - Agree to pursue evolutionary change - in other words, agree that change is necessary and agree to pursue it with an evolutionary strategy.

Pursue evolutionary change

- Starts with where we are now, what we do now, the competitive landscape etc.
- It is open ended - it is not about following a plan towards a designated end point
- Accept that any change may cause impacts and generate responses that cannot be foreseen
- It is the pursuit of fitness - not change for change's sake. This is fitness for purpose relative to the competition that will determine survival.
- it is about adaptability - having the ability to respond to change

Most of the changes that will be catalysed by Kanban will stick only through agreement.

Change Management

Agreement is something that binds people together - it is a vital social skill and it is a process. In an organizational context, agreement is a useful shorthand for valuable capability, change management.

Change management evokes a range of emotions - done well, we hardly notice it, done badly we resent and resist it.

Three models of change management highlight the role of agreement in the change process

1. Change led by a change agent
2. Change led by a change agent in combination with a mentor
3. Change led by a change team

Change led by a Change agent

Some of the issues could be

- the change agent believes that his or her main challenge is to overcome the resistance to change of team members
- scant regard is paid to peers - they are kept informed not engaged
- the customer barely gets a mention
- Management gets good news right up until the moment when the initiative is abandoned.

Mentored change agent

At its most generic, the role of a mentor is to help someone see things as they really are and through that process to help guide the mentee towards better decisions.

Some questions which the mentor might gently guide the process is

- What solutions to the problem has the team considered?
- What specifically have your peers agreed to do?
- In what ways does the customer benefit
- How does this look from the organization's perspective - alignment with company's strategy, policies and values.
- Are we solving the right problem

The Change team

Effectively getting a buy in from a lot of stakeholders - instigators of change, those designing the details of change, those implementing it and those impacted by it, and those benefiting from it.

The flow of work is visible along with its hindrances. The Kanban method is built on agreement. Early agreement on the fundamentals sets the context and tone for everything that follows.

Chapter 9 - Respect

FP3- initially respect current processes roles responsibilities and job titles

- Don't start your initiative by looking at roles - A premature focus on roles has a highly undesirable effect - it provokes resistance. Kanban's folklore borrows the phrase "Be like water" from Bruce Lee. Be like water making its way through the cracks,
- Do not be assertive but adjust to the object, and you will find a way around or through it

Respect for people

Several of Kanban's values correspond to Lean principles, but few more so than respect - here it is about how respect can be helpful guide when implementing Kanban and how Kanban method measures up to the test that respect represents

Transparency

With transparency, Kanban encourages you to visualize, make policies explicit and to implement feedback loops.

Balance

Kanban's objective of balance is to match demand and capability. Its most basic tool is the work in process limit which helps people by addressing both overburdening and starvation and by making impediments more visible.

Collaboration

These aspects of collaboration seems grounded in respect for people

- ✓ working collaboratively to deliver something of value
- ✓ improving the system collaboratively solving deep rooted problems
- ✓ treating collaboration as an end as well as a means creating greater opportunity for interactions of higher quality

Customer focus

Customer focus is a humane value - there is gratification to be found in meeting needs more still in anticipating them.

Flow

To value flow is to place sufficiently high value on smoothness and timelines that it sustains improvements to the system

Leadership

Kanban's approach to leadership involves seeing the organization's potential as a self-sustaining system, modelling behaviours we want to see perpetuated, taking opportunities and taking appropriate risks.

Understanding

Understanding is a call to a rich appreciation of the system that includes not just functions and activities but the people inside and outside the system, their capabilities needs and frustrations. To lead with understanding we must seek to avoid complacency, bravado and tampering.

Agreement

In agreement, we make a specific and long term commitment to the pursuit of evolutionary change, committing indirectly to developing the organization's capability for change.

Chapter 10 - Patterns and agendas

In the book "*Tame the flow*", Steve Tendon aligns the 9 values with 3 patterns

- ✓ Community of Trust - Understanding, agreement, respect, transparency and collaboration
- ✓ Unity of Purpose - flow, customer focus and balance
- ✓ Leadership (on its own)

Kanban's Three Agendas for Change

You can think of these as adoption approaches which you can choose to communicate according to your organization's needs appetites and ambitions

- a. **The sustainability agenda** - this describes a common approach to Kanban adoption the individual and team levels. Often the motivation is motivation is the relief that

transparency, balance and collaboration can bring from unsustainable practices and workloads

- b. **The service orientation agenda** - this adds customer focus, flow and leadership. Motivation here is the desire for significant improvements to customer delivery
- c. **The survivability agenda** - With the leadership disciplines of understanding, agreement and respect come meaningful personal and organizational commitments to pursue fitness through adaptability and capability to change.

Sustainability Agenda

With its echoes of the Agile manifesto's sustainable pace, the sustainability agenda often resonates strongly with teams that would identify themselves as Agile. Many of their existing practices and artefacts can be interpreted in terms of *transparency, balance and collaboration*.

Service orientation agenda

If the sustainability agenda is best described as a practice based approach, the service orientation agenda is based on engagement - which is *customer focus, flow and leadership*.

Progress in these areas comes from

- looking critically at what you do now
- improving end to end coordination and preventing WIP from accumulating
- shaping demand upstream
- Gaining a better understanding of the gap between customer expectations and the capabilities of the system and putting in feedback loops to control it.

David Andersen introduces the service orientation agenda through his **Kanban lens** - which describes how to view what you do now as a set of services that can be improved.

Recognise that

- creative knowledge work is service oriented
- service delivery involves work flow
- work flow involves a series of knowledge discovery activities

and then

- map the knowledge discovery workflow
- pay attention to why and how work arrives
- track work as it flows across between services.

Compared to the sustainability agenda which scales mainly vertically, the service orientation explicitly scales Kanban horizontally across services - both end to end and between dependent services

Survivability agenda

This starts with senior level commitment to the disciplines of *understanding, agreement and respect*.

Part II - Models

In Part II, the values take on a supporting role and the centre stage goes to models.

CP6- Improve collaboratively, evolve experimentally (using models and scientific methods)

Models here mean

- replicating the example of others
- following some set pattern template or routine that gives structure to one's action or thinking
- understanding the world based on a defined set of assumptions
- expecting certain kinds of outcomes as consequences of those assumptions

The various models represent an important paradigm shift

- systems thinking - looking at holistic view of systems
- Theory of Constraints - aligned to system goals
- Lean - pursuit of flow than maximal utilization of resources
- Agile using a evolutionary and collaborative approach

Chapter 11 - Systems Thinking, Complexity and the Learning Organization

Systems Thinking

Broadly Systems thinking is concerned with how systems behave as a whole - taking a holistic view, emphasising the relationships, interactions and influences among components and the behaviours and outcomes that emerge from them. The better we understand our systems relationships with its environment, the more likely it is that we will be able to identify and implement effective interventions.

Donella Meadows in her book on Systems Thinking talks of 12 leverage points to intervene in a system

12. Numbers - constants and parameters

11. Buffers - the sizes of stabilizing stocks relative to their flows

10. Stock and Flow structures - Physical systems and their nodes of intersection

9. Delays - Lengths of time relative to rates of system changes

8. Balancing feedback loops - the strength of feedbacks relative to the impacts they are trying to correct

7. Reinforcing feedback loops - the strength of the gain of driving loops
6. Information flows - the structure of who does and does not have information
5. Rules - incentives, punishments and constraints
4. Self-organization - the power to add change or evolve system structure
3. Goals - the purpose of the system
2. Paradigms - the mind-set out of which the system - its goals, structure rules, delays etc arises
1. Transcending paradigms

Complexity

Systems that contain delayed signals and feedback loops can exhibit behaviour that is very hard to predict even when they remain fully deterministic, immune to randomness. (Beer Game).

The Bullwhip effect or the Forester effect (after Jay Forrester) explains violent swings observed in supply chain inventories.

Another way to magnify the impact of amplification is via feedback loops - poorly designed feedback loops can be devastating to a system.

Causality and Cynefin Framework

Dave Snowden describes in the Cynefin framework five domains that characterize causality within systems

- **Obvious** - where one can easily categorize what we see and respond accordingly perhaps with a best practice whose outcome will be readily apparent
- **Complicated** - unobvious to a casual observer, where an expert could understand what is going on sufficiently well - to select an appropriate good practice with a predictable outcome
- **Complex** - the domain of emergent behaviour only in retrospect can we understand the impact of our interventions
- **Chaos** - where causal relationships disappear entirely even in retrospect
- **Disorder** - the state of not knowing which of the other four domains applies

Cynefin allows us to see some interventions as moving aspects of the system from one domain to another - pulling them back from chaos, simplifying the complicated and so on.

Complex Adaptive Systems (CAS)

These are multiple levels of loosely coupled self-organizing systems. Adaptive systems are more likely to keep finding configurations that maintain their edge. Their well-designed feedback loops are strategies for evolutionary change.

Knowledge, Learning and the Learning Organization

Deming's System of Profound Knowledge

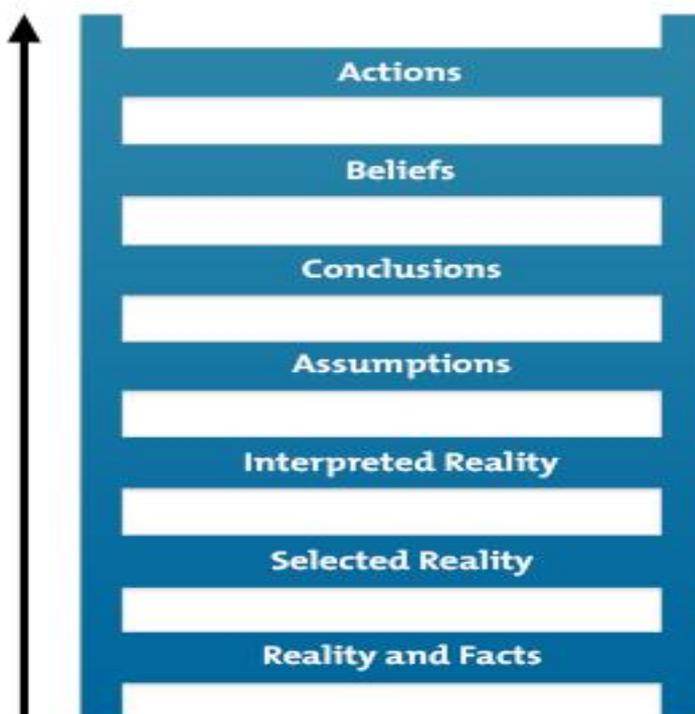
- Appreciation of a system - understanding business systems together with their context of suppliers and customers
- Knowledge of variation - understand the causes and impacts of variation in quality and the proper use of statistical methods
- Theory of Knowledge - challenging management to learn by systematically developing, testing and applying theories
- Knowledge of psychology - understanding people and what motivates them. - also psychology of change

Argyris and Double loop learning

How do organizations learn? Chris Argyris, a noted contributor in this field talks about

The Ladder of Inference - which helps explain and deal with very different conclusions that colleagues can reach. The Ladder of Inference describes the thinking process that we go through, usually without realizing it, to get from a fact to a decision or action. The thinking stages can be seen as rungs on a ladder

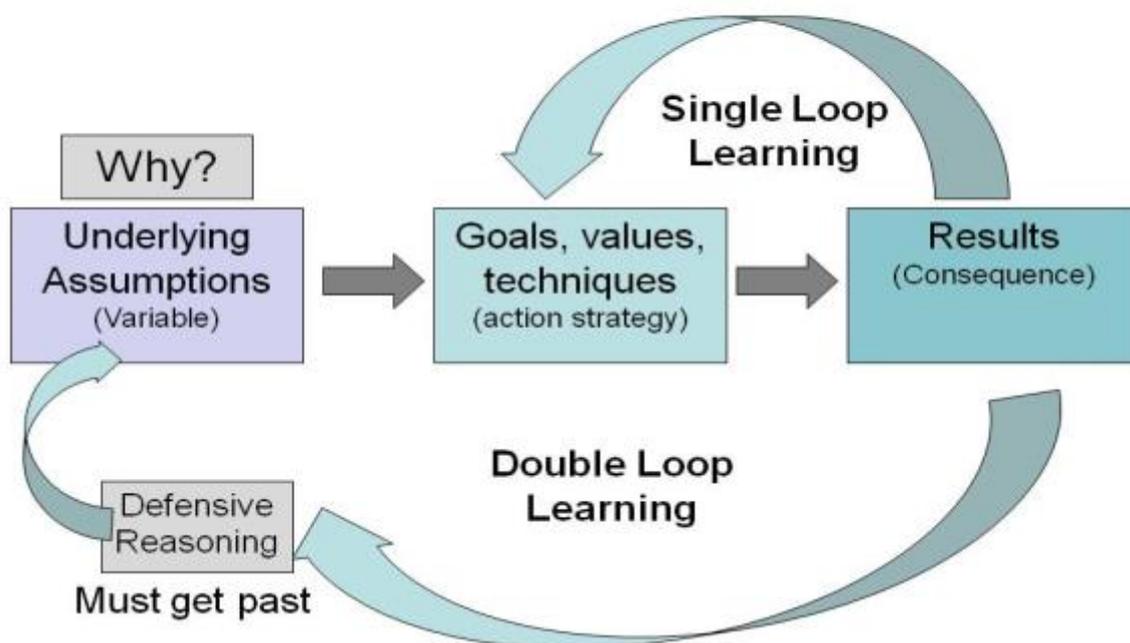
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- Espoused theory vs. theory in use - a way to seek out learning opportunities by looking at differences between what people and organizations profess versus what they actually do
- double loop learning - a simple model that elegantly describes a process of deep learning

Double loop learning - Most learning is single loop - we adjust our action strategies, our immediate goals, plans and moves according to the results we are observing. Single loop learning is very efficient when the goal is to keep a system under good control in a predictable environment.

Double Loop Learning: Argyris & Schön



In Double loop learning, instead of just quickly recalibrating when results don't match expectations, the learner digs deeper. Assumptions are challenged and mental models get discarded and new ones come up.

Though it is very difficult to engage in double loop learning, the conditions for frequent double loop learning must be created.

The Learning Organization

Peter Senge focused more on individuals and teams - comes out with 5 characteristics of a learning organization

1. Systems thinking - understanding and managing the organization as a whole
2. Personal mastery - individuals committed to the process of learning
3. Mental models - assumptions and theories made explicit, open to enquiring and challenge in an environment of trust
4. Shared vision - the challenge that unifies and energises the organization - higher purpose

5. Team Learning - social mechanism that accelerate individual learning

Senge described a learning organization as a group of people working together collectively to enhance their capacities to create results they really care about

Chapter 12 - Theory of Constraints

The Theory of Constraints has these components

- a. Process of Ongoing improvement
- b. Drum Buffer Rope
- c. The Logical Thinking Process
- d. Critical Chain Project Management
- e. Throughput accounting

The Five Focussing Steps and the Process of Ongoing improvement (POOGI)

- Identify the system's constraint - the factor most responsible for the systems failure to achieve higher performance
- Decide how to exploit the systems constraint
- Subordinate everything else to the previous decisions
- Elevate the systems constraint
- Repeat

Assumptions:

1. There is only one constraint that matters - working on other constraints would be wasteful
2. The constraint typically takes the form of a bottleneck in the process - a step that limits the pace of others in the process
3. Improving throughput takes precedence over inventory and lead time
4. Eventually after removing internal constraints, the constraint will reside externally. when this happens the system will typically be constrained by a supply side bottleneck or by a shortfall of market demand relative to capacity.

Drum Buffer Rope

Drum Buffer Rope (DBR) is the production scheduling system of the Theory of Constraints. DBR plays the role in TOC that Kanban systems do in the Kanban method.

- The Drum is a work schedule for the constraint, planned ahead of time.
- The Buffer is the time allowed for each kind of work items, component or subassembly to reach the constraint via the upstream process. Buffer management effectively subordinates the upstream process to the needs of the constraint.
- The Rope ties the buffer's input to its output. Work is released into the system according to a schedule constructed relative to the drum - the work schedule for the constraint activity.

The thinking processes

TOC recognizes that improvement implies change and that people find change difficult. TOC includes a suite of thinking tools designed to address what it calls resistance to change. TOC describes a number of layers of resistance - Efrat Goldratt has the 9 layer model which talks of the 9 layers along with the tools to address the resistance. The goal of the thinking process is to define a target state that can be delivered through a series of transformations.

Critical Chain Project Management

Critical Chain applies the thinking of Drum Buffer Rope to the problem of planning and controlling projects.

1. Start with a network of project tasks, their estimates and dependencies
2. Schedule tasks so that
 - ✓ no task is started before its dependencies are fully satisfied.
 - ✓ multi-tasking is eliminated
 - ✓ project duration is minimized
3. Identify the critical chain - the sequence of tasks that determine the project's overall duration
4. Separate task estimates into two components, the expected duration and the remaining safety margin

Move all safety margins to a buffer. These live either at the end of the project (the project completion buffer) or protecting each dependency. (feeding buffers)

Throughput accounting

TOC has its own accounting model - Throughput accounting which aims to reverse these supposed priorities of traditional management that is driven by conventional cost accounting model.

1. Reduce cost
2. Reduce required investment or inventory
3. Increase throughput

The logic of throughput accounting is that reductions in cost, capital investment or inventory that look good on paper in the cost accounting model may be damaging to throughput and therefore detrimental to the interests of the organization.

Chapter 13 Agile

Chapter 14 TPS and Lean

In 1978, Taiichi Ohno published a book describing the Toyota Production System. Some of these concepts were hardly known outside Japan

- ✓ Just in time - the radical idea that the right materials, parts and assemblies should arrive when they are needed only as they are needed and in small quantities
- ✓ Autonomation - automation with a human touch - the production line's early warning system

- ✓ The Andon system - visual indication of trouble combined with the means for ordinary shop floor workers to "stop the line"
- ✓ The Five Whys - a technique for root cause analysis
- ✓ Kanban - card based system by which just in time production is managed

Two books, much later – “The Machine that changed the world” by James Womack, Daniel Jones and Daniel Roos and “Lean Thinking” by Womack - a whole new set of Japanese terms entered the lexicon

- ✓ Kaizen - continuous improvement through incremental change
- ✓ Kaikaku - radical change
- ✓ Heijunka - production levelling - that is deliberately mixing work on the production line rather than producing similar work in batches
- ✓ Poka Yoke - mistake proofing
- ✓ Gemba Gembatsu Genjitsu - the three reals - the real place where work is done, the real thing and real facts respectively
- ✓ Honshin Kanri - Strategic planning and policy deployment

TPS and Lean in perspective

TPS is a great example of systems thinking. It starts with a vision - a true north that gives the direction for change.

- Single piece flow, in sequence, on demand, with zero defects, 100% value adding activities and security for the people performing them

Two pillars to support the purpose of Toyota - taking into account the conditions prevailing in post war Japan where land, factory space, plant and materials were in short supply

- Just in time
- Respect for people

Lean Improvement

Much of the Lean thinking is built into and around these 5 improvement steps

1. Identify value - from the customer's view point
2. Identify the value stream - the value creating steps in the process and seek to eliminate the non-value adding ones
3. Create flow - removing delays between those value creating steps seeking smoothness
4. Establish pull - where work is taken upstream only in response to downstream demand ultimately from the customer
5. Identify waste - removing impediments to smooth flow reducing delays reducing inventories and eliminating defects at source etc.

Ohno identified 7 wastes or non-value adding activities

1. Transportation - source of delay cost or risk of loss or damage
2. Inventory - materials work in progress finished by undelivered

3. Motion - damage to people and equipment caused by the production process
4. Waiting - time spent by work items in inactive states
5. Over processing - doing more work than is necessary to meet specifications
6. Over Production - producing work in excess of immediate demand
7. Defects - effective capacity wasted on bringing inferior work upto the required standard

This corresponds to the 7 wastes in Lean Software Development

- Partially Done Work.
- Extra Features
- Relearning.
- Handoffs
- Delays
- Task Switching
- Defects

Lean Startup

Eric Ries's Lean Startup model takes product development into areas of extreme uncertainty - where basic things like customers, business models or the basic shape of the product are largely unknown.

Its continuous incremental model is organized around an experimental improvement loop called "Build – Measure - Learn" - which is highly suited to web based services where concepts like continuous delivery and A/B testing allow products to evolve rapidly.

Kanban and Lean

From a Lean perspective, Kanban has

- Visual pull systems represented by the values of transparency and balance
- Respect for people in the form of collaboration, leadership, understanding agreement and respect

Chapter 15 Economic Approaches to flow

Some economic concepts important in Kanban are

- ✓ Cost of Delay - Don Reinertsen
- ✓ Cost of carry - tool used in many traditional industries
- ✓ Real Options - Chris Matts and Olav Maasen

Cost of Delay is a way to understand the time dependence of value and a good guide to scheduling decisions.

Cost of Carry measures the cost to the organization of the inventory that it holds.

Options or Real Options takes from the world of banking the idea of an option instrument and applies it in the field of project evaluation.

Chris Matts and Olav Maasen have distilled options into 3 principles

- ✓ Options have value
- ✓ Options expire
- ✓ Never commit early unless you know why

Putting it altogether

- Put your project portfolio on a diet - aggressively reduce batch sizes towards the likely current ideal
- Don't treat all work as alike. At all levels understand and classify work by its urgency profile and control the overall mix of work
- Within each urgency classification, learn to identify work that carries a high cost of delay - Implement queuing discipline that maximizes this throughput.
- make your options visible
- Whether through Cost of Delay or Cost of Carry - understand the cost of WIP. At each level find ways to control it and expect it to keep on reducing
- Continually seek to reduce transaction costs

Chapter 16 - The Kanban Method

Personal Kanban

In "Personal Kanban - Mapping Work Navigating Life", Jim Benson and Tonianne DeMaria Barry describe how Kanban can be applied to one's personal workload.

Jim and Tonianne distill Kanban down to the two practices most relevant to "choosing the right work at the right time"

1. Visualize your work
2. Limit your WIP

These correspond to the four values of Kanban - transparency, balance, flow and collaboration.

Scrumban

Scrumban is a name coined by Corey Ladas for what happens when "what you do now" is Scrum and you apply Kanban. Here

- ✓ The team organizes work according to its "done-ness" - which covers acceptance, deployment and customer validation states
- ✓ Stand up meetings are organized around the board
- ✓ Team pays more attention to the amount of work started but not yet finished and hence finish tasks sooner - explicit WIP limits may be introduced.

- ✓ Greater attention is given to later stages of the process such as continuous delivery
- ✓ Having decoupled releases from sprint planning, the system now accommodates work of different types and speeds. Mid sprint changes become much easier to accommodate, classes of service may be offered
- ✓ Identify riskiest items first and have them broken down as necessary
- ✓ With need for customer validation made more visible, new feedback loops begin to emerge.

Chapter 17 Smaller Models

This chapter covers a number of models that support the concepts such as

- ✓ Little's Law
- ✓ Satir Change Model
- ✓ Two coaching models - GROW and Toyota's A3
- ✓ Jeff Anderson's Lean Change canvas
- ✓ various models of facilitation including games
- ✓ two models of leadership and collaboration - T shaped leadership and triads

Little's Law

WIP = Delivery rate * Lead Time or Delivery rate = WIP / Lead time

Satir Change Model

Virginia Satir describes changes in 5 stages

- late status quo - the period before the introduction of foreign element
- a period of resistance - the foreign element has been introduced but we try to cling onto the status quo
- Chaos - not dealing adequately with the foreign element and status quo is no longer tenable
- Integration - the penny drops the pieces fall into place the transforming idea allows the foreign element to be taken on board
- New Status quo - have a new status quo when the process of integration is complete

Thinking Tools and Coaching Models

1. **GROW** - John Whitmore – “Coaching for Performance” - Goals, Reality Options Will
2. A3 - to fit into a A3 size paper

Includes

- some context perhaps a visualization of the current process, qualitative or quantitative analysis of the current condition
- the target condition
- list of possible counter measures - ideas that could mitigate things when we dont like the current condition
- a plan that outlines how the chosen counter measure will be implemented

3. Lean Change Canvas - Jeff Andersen

- Urgency
- Target options
- success criteria
- vision
- communication
- action
- change participants
- commitment
- wins / benefits

4. Group facilitation and games

a. **Kaner's Facilitation model** - In Facilitator's guide to Participatory decision making, Samuel Kaner describes the role of the facilitator guiding through 3 stages

- divergence - ensures plentiful supply of raw material, generating ideas identifying problems and so on
- then comes the uncomfortable part - the groan zone in which the raw material is sifted and analysed. after the energy and creativity of the divergence phase, the discomfort of this phase stems from the lack of a clear way forward
- finally comes convergence where thoughts become increasingly well organized and agreed upon

b. **Serious Games** - In her book "Reality is Broken - Why games make us better and how they can change the world", Jane McGonigal describes 4 essential properties of games

- ✓ a clear goal
- ✓ a set of rules or constraints
- ✓ feedback or a way to keep score
- ✓ optional participation

Part III - STATIK

STATIK - Systems thinking approach to Introducing Kanban

Six steps

1. Understand sources of dissatisfaction
2. Analyse demand and capability
3. Model workflow
4. Discover classes of services
5. Design Kanban systems
6. Rollout

STATIK helps to connect a Kanban implementation to the needs of the Organization. STATIK requires you to capture multiple perspectives.

Chapter 18 - Understand sources of dissatisfaction

Any kind of deliberate change requires two key pieces of context

- ✓ *its scope* - boundary around what we do now within which the change will be focussed - the "*what of the change*"
- ✓ *its objective* an expression of what we hope to achieve from the change, relative to how things currently are - they "*why of the change*"

It is better to start with sources of dissatisfaction because

- ✓ they lead to something positive - a set of things people might want to achieve.
- ✓ And to get a perspective of those working within the system and those outside the system.

Two questions

1. From your personal perspective, and from what you perceive from others inside and outside, what are the main sources of dissatisfaction with the system? In other words *what needs and whose needs aren't met*
2. What sources of variability and unpredictability would you highlight? In other words what frustrates you and the broader system as you try to deliver things of value with quality and timeliness

Both questions are about needs and the systems current capability to satisfy them.

These questions could be discussed in the following ways

- going out and talking to people individually
- gathering people together in a workshop and asking those questions and exploring them
- in a workshop online setting, using facilitated exercises to generate and organize a large quantity of responses

One of the ways of coming out with the discussions is

- ask participants to write one sticky note per issue to write their dissatisfactions down
- gather and cluster - the sticky notes, have closely related items stacked together / eliminate duplicates
- choose a name for each cluster - some
- do a dot voting - each participant having 3-5 votes and rank the items by the number of votes received.

Another option is to rely on the opinions of few key people (HIPPO) - though not recommended.

Organize and explore

A good facilitator knows not to allow this information generating exercises to converge prematurely on too narrow a range of results. Stick to the language of dissatisfactions and frustrations - not solutions

Take care to explore needs without assuming particular solutions.

Finally share, invite feedback, refine.

What would you have achieved?

- shared understanding and agreement on dissatisfactions - the beginnings of a case for change that a wide range of stakeholders will have already bought into
- some kind of sponsorship or at least a good idea of where to seek it

Chapter 19 - Analyse Demand and Capability

This is about gathering some specific quantitative and qualitative facts about the current process that will inform the design of the Kanban system

Qualitatively

- ✓ understand different types of work that will help you identify different variations in the workflow that need to be managed
- ✓ understand different sources of work that will help you prepare for and manage demand
- ✓ understand why work is needed - the types of risk involved and how they can be managed appropriately

Quantitatively

- ✓ understand quantity of work involved - to help you choose a manageable granularity to visualize and control it
- ✓ understand the gap between actual process capability and expectations of customers and highlight the improvements needed
- ✓ quantitative analysis of work recently delivered and currently in progress - to tell you where improvements are likely to be found

Knowing what you are delivering to whom and why

What

- get to understand from various participants what are working on, how work is organized, what gets delivered etc. - in short the process flow

To whom

- can refer either to the downstream activity or function or to the ultimate customer. Often there are multiple to whom, in which case it is worth finding out
- whether the workflow involved differs by customer

Why

- This is a follow up of what and to whom - to set up the why question. Why does the customer need them? What is the impact to them of faster or slower delivery?
- Does our process or product strategy meet their needs effectively enough?

Quantitative analysis

Questions like

- ✓ How often do we deliver
- ✓ How many items go in each delivery
- ✓ How long do typical deliveries take?
- ✓ How many items are currently work in progress - what is their age profile
- ✓ Try to visualize using histograms, graphs, Pareto charts, CFDs etc

Flow efficiency

This is one impactful metric - it is the ratio of touch time to the overall lead time between defined start and finish points expressed as a percentage, Touch time is the total amount of time a work item spends actively being worked on.

How work arrives

For each type of work, find out

- ✓ how does it arrive
- ✓ at what rate does it arrive
- ✓ does work arrive in large batches or bursts
- ✓ what are key measures of success
- ✓ how well do they align with customer outcomes

Armed with this information, you will have a good feel for

- ✓ what gets produced, in chunks of what size and how often
- ✓ what gets asked for, how, when and why
- ✓ how much work lies between and for how long
- ✓ the dissatisfactions of those outside the process
- ✓ the frustrations of those inside

Chapter 20 - Model workflow

This chapter looks at 3 different approaches to modelling the workflow that our Kanban system is going to support

1. sketching it out
2. top down decomposition
3. bottom up organization

Sketching it out

- ✓ a formal business process or a value stream mapping can be used or any other process which comes out with the high level flow

Top down decomposition

- ✓ writing down a very rough answer via a couple of guiding steps and refining a little
- ✓ this would include
 - identifying your commitment points - the points at which you first commit to start building or servicing something to deliver/ deploy
 - give category names to the states or activities before between and after - e.g. backlog, engineering implementation
 - break down category names in a way that reflects the reality on the ground - backlog -> received, estimated, prioritized / engineering -> development, test
 - Identify the queues where work waits between active states and refine if necessary. e.g. in To Do / Doing / Done scenario, ask the following questions
 - Are there different degrees of To do? Do we organize e by activity or priority
 - what happens in "doing"
 - are there different degrees of "done" - how do we find out if it is really "done"

Bottom up organization

Instead of modelling the work flow, organize the work items that we have. Questions like

- ✓ what does this item need
- ✓ what will this item need before it is more like that one
- ✓ what will this item need before it can become complete-
- ✓ how did this item get to here

Chapter 21 - Classes of Service

Classes of service are categories associated with customer expectation and schedule sensitivity.

The 4 categories are

1. Expedite - work items that are so urgent that we will drop other work in order to give them immediate attention
2. Date driven or fixed date - work items whose delay beyond a specific date will result in a significant penalty being incurred
3. Standard - urgency driven work to be delivered in some customer agreed order or sequenced as per policy
4. intangible - system improvements, maintenance upgrades experiments in technology or market whose direct business value is hard to quantify

These classes should ideally be

- ✓ easily recognized in advance
- ✓ require different handling scheduling and risk management internally
- ✓ will influence reasonable expectations externally

Discover, Check

For each work item

- ✓ are all items treated as though they are equally urgent
- ✓ what choices are offered to the customer
- ✓ are these SLAs in place - are they effective
- ✓ what items are getting special treatment

Typically, fixed date comprise 20% of the workload, intangible - 10-20% and a realistic provision for expedited unplanned work - the majority should be for high value urgency driven work

Classes of service and other categorizations enable some broad brush prioritization decisions, have them aligned to wider corporate priorities and match them to customer needs.

Chapter 22 Design Kanban systems

Scope, Work Item granularity, Work item states

These 3 parameters are best decided together - the scope shouldn't be too large, granularity not too small and work item states which changes at periodic intervals

Also depends on who is the board for - and the purpose of it - a board designed for CIO could be different than that for a team

Sequential States

This could be Backlog -> Engineering -> Implementation -> Done with Backlog subdivided into -> Received, Estimation, Prioritized / Engineering -> Dev, Test

Parallel states

It isn't always possible to arrange states in a strict left to right sequence - especially when some state changes happen in parallel. e.g. work may proceed optimistically allowing approvals to be recorded after work has started or work may get blocked on a technical, quality or business related issue at any stage in the process.

So here checkboxes could be one of the ways to make things visible - Use of pink stickies could denote blockers

Defects

The blocker sticky technique is often used to indicate the presence of defects. Ideally work items should not advance to the next stage if it is known to be defective or the item, if needed to advance to the next stage can be flagged with a pink stickie - but again it is a call taken by the team / product owner

Dependencies

This covers two concepts - dependencies between work items and work items that require attention from other services. Here you could either

- ✓ show the dependent work item as blocked
- ✓ Move to the work item to a holding area

Other dimensions

If there are a large number of work items to be visualised, it is better to organize them by additional dimensions such as

- ✓ work item type and/or class of service
- ✓ source
- ✓ some kind of less permanent category - initiative project epic sprint etc
- ✓ work item's owner

The two main choices for representing these dimensions visually are

- ✓ at a ticket level using some combination of ticket colour, annotation or adornment.
 - default colour of yellow sticky for standard work items
 - amber for date driven work
 - red for expedited work items
 - An annotation denoting the sprint for which the work item was committed
 - marking the ticket with the initials of owners
- ✓ adding lines to demarcate horizontal swim lanes across the board or part of it - e.g.
 - a permanent swim lane dedicated to expedited items
 - swim lanes dedicated to teams or people
 - Swim lane that organize work items by project and so on ..

Limiting WIP

A true Kanban system incorporates some mechanism for limiting the amount of work in progress. There are numerous ways to achieve this

- ✓ numeric WIP limits, each controlling the amount of WIP in a single column / span of columns / horizontal swim lanes
- ✓ physical constraints such as the number of horizontal swim lanes available
- ✓ limits of the number of tokens (e.g. personal avatars) in circulation and attaching them to tickets
- ✓ policies that control for example the WIP per person or class of service
- ✓ some external mechanism that releases work into the system only when there is capacity

Review

It is a good idea to review the board design before deeming it to be your initial one..

- ✓ How does the board look when populated with work items? Does it organize them effectively? is there enough room?
- ✓ How much movement will we see between Stand-ups ? Not enough? Too much?
- ✓ Is it understandable by its intended users? too complicated ? too simplistic

- ✓ Does it make unreasonable demands or assume changes of process, organization or role that aren't yet agreed upon?

A good design addresses multiple needs of a broader nature:

- ✓ it brings transparency to what is happening and how it happens, helps better decisions to be made and encourages self-organization and collaboration.
- ✓ it helps to bring balance between demand and supply - across different categories of demand
- ✓ it encourages both thought and action with respect to customer focus and flow
- ✓ in what ways does this design begin to address the specific dissatisfactions and frustrations you captured at the very start of the process.

These review considerations apply not only when designing a board for the first time, but evolving it too.

Chapter 23 - Rollout

Kanban implementation is a 3 stage process

1. planning the engagement - preparation in terms of participants, venues, tools, supporting materials etc.
2. shaping the agenda - approaching STATIK with the explicit aim of producing a compelling set of agreed upon priorities, goals and actions,
3. pulling change through the system - maintaining momentum into the future ensuring that the progress would be both visible and meaningful

Planning the engagement

It is important to prepare properly ahead of any engagement. As a facilitator, these are the kinds of questions that you need to ask yourself when planning to use STATIK

1. understand the sources of dissatisfaction
 - Do you have a rough idea of the exercise
 - Who should participate? Who would represent the people who work inside the presumed system boundary? Who would represent the system's customers?
 - What tools will you use to solicit and organize a good range of responses
2. Analyse demand and capability
 - Are you ready to capture the "what, to whom and why?"
 - Will you ask for some data in advance or will you wait to see what other participants want to do? What support can you provide?
3. Model workflow
 - What is your preferred approach (sketch, top down, bottom up)
 - Are you armed with searching questions for reviewing the output
4. Discover classes of service
 - Will you get more traction approaching classes of service as an internal tool for organizing and scheduling work or as a way to explore customer expectations?
5. Design Kanban systems

- how will you introduce the concepts and share what has worked elsewhere
- how much time would you want to spend refining designs before allowing them to be tried in the field
- physical or electronic - what limitations with respect to physical, geography, organization, privacy and security would need to be accommodated

Shaping the agenda

Positioning, Purpose and Priority give a high level shape

Positioning

How you choose to engage with the organization and its people will depend both on context and your own preferences.

Positioning is based on

- ✓ the Kanban method has been described as the humane - start with what you do now approach to change
- ✓ Explore principles, practices and values thinking how they apply in our situation
- ✓ Take a look at "what we do now" - using what is known as the Kanban lens. This encourages us to recognize that
 - what we do - our flavour of creative knowledge work is service oriented
 - service delivery involves workflow
 - work flow involves a series of knowledge discovery activities
- ✓ through a series of exercises we will do the following
 - map our knowledge discovery workflow
 - pay attention to how and why work arrives
 - equip ourselves to track work as it flows across and between services

- To ensure this exercise's success we will take time to

- agree on the scope and purpose of the system under review
- identify sources of dissatisfaction which we will do from multiple perspectives
- prioritize actions that begin to address those dissatisfactions and between align the design and operation of the system to its purpose

Purpose

- Understand the purpose of the system
- Identify gaps and measures of success will help focus on the subsequent design activities and help in the rollout

Priorities

It is important to prioritize the values and identify a top three or four around which a compelling call to action can be built.

- Kanban values exercise

- Kanban knowsy group game

Pulling change through the system

- Good reference points - the Kanban kick start field guide by Christophe Achouiantz and Johan Nordin, Pull based change by Yuval Yuret and Lean change Method by Jeff Anderson.
- Allow small increments of change to be pulled from a backlog and have it managed through to implementation
- Use of Kanban Depth Assessment tool to prioritize practices that should be implemented / prioritized or focus on dissatisfactions or problems using these as a driver for change.
- Identify increments of change
 - Give a score from 1 to 4 to the following
 - Our system exhibits this aspect barely, if at all
 - our system is somewhat capable of exhibiting this aspect
 - our system exhibits this aspect convincingly for the most part
 - our system departs from this only very exceptionally - we manage the consequence when it does so

Transparency

1. Work items are organized visually by type, stage, waiting in a queue, parallel work stream and class of service
2. It is clear which items are blocked and for what reason
3. To the extent that it matters, it is clear who is working on what
4. Explicit policies capture shared expectations on work item selection, quality criteria and so on
5. The progress of the work and the overall effectiveness of the system are subject to review at a range of cadences - from at least daily to quarterly and longer.
6. Attention is paid to how progress demand and capability are reported both to the customer and the wider organization
7. Metrics have a clear relationship with the system's purpose

Balance

1. WIP is limited such that no individual activity or work stream is overburdened or is consuming a bigger share of available effort or shared resources that is appropriate
2. Work is pulled into and across the system only when capacity is available
3. WIP limits apply to work started but not completed
4. The system comfortably accommodates a variety of schedule risk profiles (date driven / urgency driven) and classes of service
5. In allocating capacity between competing sources of demand, consideration is given to the needs of all stakeholders and to the overall capability of the system over a broad range of time spans

Collaboration

1. Improvements are framed and structured as experiments and managed visually

2. Other bodies of knowledge are used as models for improvement
3. Collaboration is embraced as a source of performance , driver of improvement and an antidote to system generated frustration
4. The system is open to change from the inside (Self organizing) as it pursues fitness for purpose

Customer Focus

1. the delivery workflow is understood to be a process of knowledge discovery, in which needs, possibilities and capabilities are explored
2. upstream of defined commitment point, work items are managed as options
3. downstream of delivery, work items continue to be managed until their utility in the hands of the customer has been validated

Flow

1. Work items are sized and selected to achieve a strong and reliable flow of value
2. Batches are sized and releases scheduled to maximize overall economic outcomes
3. Work items of exceptional value and risk are managed appropriately
4. The system reliably delivers non exceptional work items with appropriate predictability
5. Measured end to end, time spent in active knowledge discovery dominates time lost to delays (queuing, multi-tasking, blocking) and other kinds of work
6. Dependencies between work items and on other services are identified and visualized in good time
7. Work items can be scheduled for release independently of their commitment to the system

Leadership and Leadership disciplines

1. Leadership is open to all, acts of leadership that bring about change are worthy of celebration
2. There is a shared and ongoing commitment to change - based on an evolving understanding of what we do now and its alignment to purpose from the perspective of stakeholders
3. Evidence of the need for change is kept close to the surface
4. Change is safe, its downside risks are identified and mitigated
5. The potential benefits of change are watched and nurtured
6. Change is implemented through agreement, the practices of change and the capability to change are themselves focuses for improvement
7. Respect is always a given - at times of change people's attachment to their current roles, organization and practices is never underestimated

Visualizing the change

- Use of radar charts to visualize progress of changes.
- Jeff Andersen in Lean Change canvas - uses Agree or Urgency / Negotiating the change / Validate adoption / Verify performance

Not all change is alike

- ✓ Kanban is not about firefighting or managing existential crises - but if you find yourself needing to react in such a situation, it is possible Kanban will help
- ✓ Introducing Kanban is usually a proactive change and is designed to generate further proactive change
- ✓ Kanban is not just about improvement - but it is also about ambition

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