Towards a framework for managing knowledge work

How TOC influenced my thinking ...

And where it didn’t!
How I got into this...

- Published in 2003
- Synthesized
  - Feature-Driven Development
  - Lean Product Development
  - TOC
    - Five Focusing Steps
    - DBR
    - Throughput Accounting
    - TDD
Futility

- I was writing the wrong book
- Lots of (I believed at the time) logically correct, valid guidance but likely to be almost impossible to implement
- Humans resist change!
- Installing methodologies (defined or designed processes) meets with resistance
My Evolutionary Epiphany

- What was needed was a “start with what you do now” approach – an evolutionary approach
- An approach where consensus could be formed around the no.1 problem and what to do about it
- Theory of Constraints and its Five Focusing Steps provided such a method
  - Identify the bottleneck (with consensus)
  - Agree (collaboratively) what to do about it
- Resistance (if any) is minimized!
Sequel published 9 years later

Lessons in AGILE MANAGEMENT
On the Road to Kanban

115,000 words explaining how FDD+TOC+LPD morphed into Kanban!
Motivation for the Kanban Method
Traditional Change is an A to B process

- A is where you are now. B is a destination.
  - B is either defined (from a methodology definition)
  - or designed (by tailoring a framework or using a model based approach such as VSM* or TOC TP**)
- To get from A to B, a change agency*** will guide a transition initiative to install B into the organization

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* Value stream mapping, ** Theory of Constraints Thinking Processes
*** either an internal process group or external consultants
Daniel Kahneman has given us a simple model for how we process information.

System 1
Sensory Perception
Pattern Matching

Learning by Experience

FAST
But slow to learn

System 2
Logical Inference Engine

Learning from theory

SLOW
But fast to learn

Daniel Kahneman
How we process change...

Daniel Kahneman

I logically evaluate change using System 2

Silicon-based life form

I adapt quickly

I feel change emotionally using System 1

Carbon-based life form

Daniel Kahneman

I adapt slowly
Adopting new processes challenges people psychologically & sociologically

- New roles attack identity
- New responsibilities using new techniques & practices threaten self-esteem & social status
- Most people resist most change because individually they have more to lose than gain
- It is safer to be conservative and stick to current practices and avoid shaking up the current social hierarchy
- Only the brave, the reckless or the desperate will pursue grand changes
TOC Observation #1

- Thinking Processes represent managed change with a transition initiative
- Despite all the counter-measure considerations with negative branches the “designed destination” process changes are likely to invoke (passive-aggressive) resistance amongst a knowledge worker workforce
The Kanban Method
The Kanban Method...

- Rejects the traditional approach to change
- Believes, it is better to avoid resistance than to push harder against it
  - Don’t install new processes
  - Don’t reorganize
- Is designed for carbon-based life forms
  - Evolutionary change that is humane
The Kanban Method...

- Catalyzes improvement through use of kanban systems and visual boards*
- Takes its name from the use of kanban but it is just a name
- Anyone who thinks Kanban is just about kanban (boards & systems) is truly mistaken

*also known as "kanban" in Chinese and in Japanese when written with Chinese characters
Water flows around the rock

“be like water”

the rock represents resistance
Kanban should be like water*

In change management, resistance is from the people involved and it is always emotional (system 1).

To flow around the rock, we must learn how to avoid emotional resistance.

* [http://joecampbell.wordpress.com/2009/05/13/be-like-water/](http://joecampbell.wordpress.com/2009/05/13/be-like-water/)
Principles behind the Kanban Method

- Start with what you do now
- Agree to pursue evolutionary change
- Initially, respect roles, responsibilities and job titles
- Encourage acts of leadership at all levels

The first 3 principles were specifically chosen to address System 1 objections, to flow around the rock of emotional resistance in humans
The Kanban Lens

Kanban asks us to view the world of work through a new lens

- Creative work is service-oriented
- Service delivery involves workflow
- Workflow involves a series of knowledge discovery activities

Kanban would be less applicable if a service-orientated view of work were difficult to conceive or the work was sufficiently new that a definable series of knowledge discovery activities had not emerged.
6 Practices Enable Process Evolution

The Kanban Method

Visualize
Limit Work-in-progress
Manage Flow
Make Policies Explicit
Implement Feedback Loops
Improve Collaboratively, Evolve Experimentally
(using models & the scientific method)
Any WIP Limited Pull System will work

(a) D-B-R
(b) CONWIP
(c) D-B-R + CONWIP ("CapWIP")
(d) Kanban
• Arguing about which pull system is better is futile for knowledge work
• Limiting WIP catalyzes conversations about problems and how to improve (evolve)
• Limiting WIP also forces conversations about what to…
  • Work on now
  • Leave until later
  • Abandon altogether
• Limiting WIP forces real option theory thinking
Flow Management
Flow efficiency measures the percentage of total lead time that is spent actually adding value (or knowledge) versus waiting.

Flow efficiency = \( \frac{\text{Work Time}}{\text{Lead Time}} \times 100\% \)

Flow efficiencies of 1-5% are commonly reported. * > 40% is good!

Multitasking means time spent in working columns is often waiting time.

** Hakan Forss, Lean Kanban France, Oct 2013
Focus on Delay

- Eliminating sources of delay is the highest leverage on improving the system.
- Delay comes in both special cause (external) forms such as vendor dependencies and common cause forms such as queues and buffers.
Upstream Kanban Prepares Options

Pool of Ideas | Biz Case Dev | Requirements Analysis | Ready for Engineering | Committed | Development | Testing | Verification

Min & Max limits insure sufficient options are always available

Options

$$ spent acquiring options

Commitment point

Committed Work

Abandoned

Reject

Options

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Bottleneck should always be downstream of the commitment point.

Bottleneck workers should never be asked to work on something that is optional and may be discarded. This includes any risk analysis (or estimation in legacy processes) that may be required to assess viability of an option.
There is a natural boundary between "the business" and the delivery/engineering function.

One generates options, the other converts options / delivers commitments

Different governance is required for each
TOC Observation #3

- Our delivery/engineering function must be capacity constrained, in comparison to...
- Our business function must generate excess options. Options are discarded in proportion to the risk & uncertainty in the business domain
- Upstream business function must have “slack” capacity. This is used to generate options that will be discarded
Common cause variability
Variability in Delivery Rate (velocity)

- It is important to understand the role that delivery rate plays in long term planning. However, it is not useful for short-term goal setting due to extreme variation.

- Often velocity exhibits a +/-2x spread of variation.

- As a result velocity cannot be used as a short-term planning tool.

See following examples.
Velocity Variation

South African Team from 2011 plotted per Sprint (2 weekly)
Mean 29, UCL (+1 sigma) 43 (+1.5x), LCL (-1 sigma) 15 (-2x)
Mattias Skarin client based in Paris in 2009/2010, plotted weekly
Mean 42, +1 sigma = 55, -1 sigma = 29 (+/- 1.4x)
Investment Bank, London, Extreme Programming
Weekly Mean 10, Max = 16, Min = 6
Spread (+/- 1.6x)
TOC Observation #4

• In as many of 90% of cases the bottleneck is moving about on a day-to-day basis
• Playing “stop the bottleneck” whack-a-mole isn’t a good use of managerial time and is frustrating for workers
• Kanban systems solve this problem
• All we need to know is that the bottleneck is downstream of the commitment point
• Selecting the commitment point is the valuable lever rather than managing a bottleneck in a narrowly defined activity
Evolutionary Management
Evolutionary change has no defined end point

We don’t know the end-point but we do know our emergent process is fitter!
Institutionalize feedback systems to enable evolutionary change.

Manager to subordinate(s) (both 1-1 and 1-team)
Fitness criteria are metrics that evaluate capabilities external stakeholders care about

- If we have a service-oriented view of the world, and want to evaluate service delivery then we already know what customers care about
  - Lead time
  - Quality
  - Predictability
  - Safety (or conformance to regulatory reqs)
If we order a pizza we know what we care about...

- Fast delivery
  - lead time from order to delivery
- Accuracy and quality
  - Pepperoni not Hawaiian
  - Still warm on delivery
- Predictable Delivery
  - If they say “ready in 30 minutes”, we want delivery in 25-35 minutes
Disintermediate!
Risks, fitness criteria & classes of service should be explicit & transparent

Expose risk, classes of service & fitness criteria at all 3 levels of feedback

Operations Review

System Capability Review

Standup Meeting

manager to subordinate(s) (both 1-1 and 1-team)
Kanban viewed through a Cynefin* Lens

**Simple Kanban System**

- Simple Kanban Method
- Novel Practices

**Deep Kanban System**

- Complex Kanban Method
- Emergent Practices
- Chaotic

**Multiple work types**

- Pragmatic Philosophy
- Holistic Philosophy
- Probabilistic
- Quantum Mechanics

**Single work type**

- Deterministic
- Newtonian Physics

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Kanban systems alone aren’t enough in the unordered domain.

*Source: [Cynefin](http://en.wikipedia.org/wiki/Cynefin)*

*http://en.wikipedia.org/wiki/Cynefin*

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TOC Observation #5

- TOC’s Five Focusing Steps are a Complex Domain approach
- Thinking Processes are an unordered domains, reductionist approach
- Reviving a deep interest in Five Focusing Steps and an evolutionary approach is vital if TOC is to be relevant for managing knowledge work
Other TOC concepts I’ve tried and discarded
Critical Chain

- In software development, chains were often arbitrary
- I was serving the method, not it me
- Estimation is speculative
- Decomposition is reductionist
- Hedging for common cause variability meant buffers were too large!
  - Stakeholders only willing to accept 10-15% project buffer
  - Mathematics suggested 50-66% buffer required
Throughput accounting

- Time on the bottleneck requires speculative estimation
  - Reductionist
  - Not pragmatic
- Bottleneck workers have to estimate future optional work
  - Disruptive
  - Doesn’t exploit the bottleneck
- Core conflict!
TOC Observation #6

- Developing the Kanban Method has been an evolutionary, experimental process
- Much of what has survived & thrived as concepts is counter-intuitive
- Analogous mapping of practices from other domains such as manufacturing has proven dangerous or fruitless
- Dogmatic attachment to practices leads to dissonance and denial of actual observations
Conclusion
Differentiators of the Kanban Method

- Pragmatic
- Probabilistic
- Evolutionary/Emergent
- Service-oriented
  - Not project oriented

- Kanban Method is designed for complex domain problems
- If humans are involved the domain is complex
  - System 1 always wins a cognitive discipline dispute
A future for TOC in knowledge worker industries

• Too much of TOC assumes silicon-based life forms in the workplace
• Sort the pragmatic, probabilistic and evolutionary techniques from the reductionist and speculative techniques
• Amplify the Five Focusing Steps and other work that applies to the complex domain
  • Ray Immelman’s work on tribalism embraces the complex nature of humans
  • It embraces that System 1 is in charge
Thank you!
David Anderson is a thought leader in managing effective software teams. He leads a training, consulting, publishing and event planning business dedicated to developing, promoting and implementing sustainable evolutionary...

He has 30 years experience in the high technology industry starting with computer games in the early 1980’s. He has led software teams delivering superior productivity and quality using innovative agile methods at large companies such as Sprint and Motorola.

David is the pioneer of the Kanban Method an agile and evolutionary approach to change. His latest book, published in June 2012, is, Lessons in Agile Management – On the Road to Kanban.

David is a founder of the Lean Kanban Inc., a business dedicated to assuring quality of training in Lean and Kanban for knowledge workers throughout the world.