Institutionalizing Process Improvement: Is it a Lottery?

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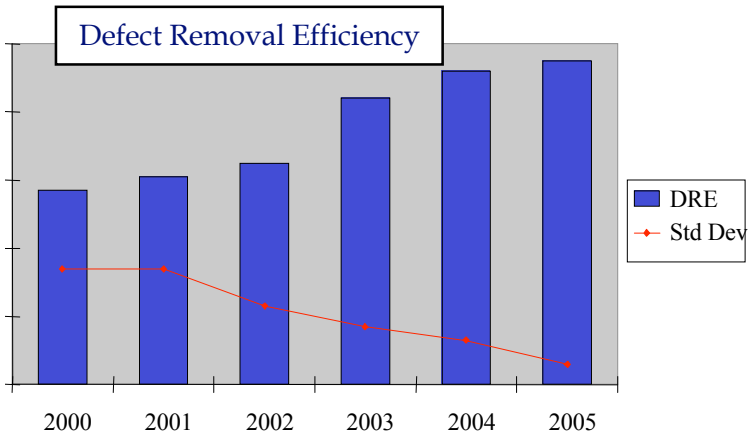
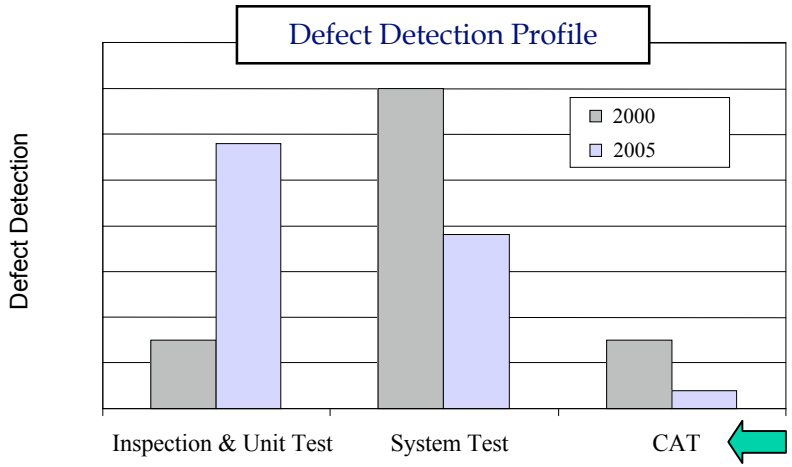
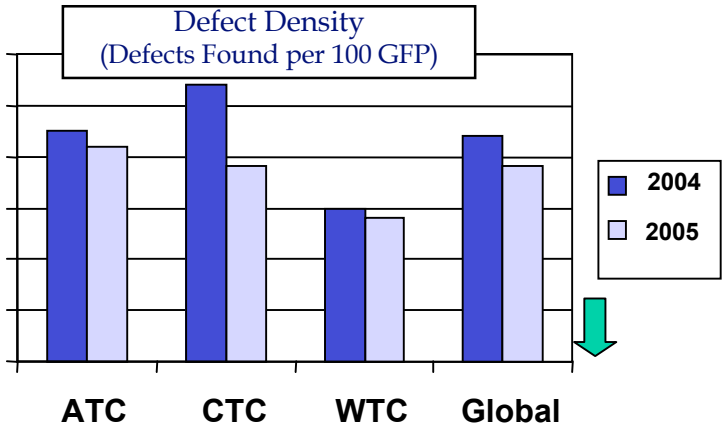
GTECH Corporate Profile

- Incorporated in 1980, headquartered in Rhode Island, USA with 5,300 employees worldwide in more than 50 countries and $1.25 billion in total revenue in FY 2005.
- The leading provider to the world's lottery industry with market share of more than 70% and more than 438,000 point-of-sale devices linked to GTECH central systems.
- Handles more transactions a year than all of the leading credit card companies combined (50 billion transactions in FY04).
- In 2003 and 2005 software development organizations located in Austin, Chennai, and Warsaw were formally assessed at CMM Level 3. Updated CMMI/SW Level 4 processes were deployed in 2005.
- In 2006 it was announced that Lottomatica S.p.A. (Milan: LTO) and GTECH have entered into an agreement pursuant to which Lottomatica will acquire GTECH.

Process Improvement Journey: Tangible Results







Over the course of its process improvement journey GTECH has enjoyed:

- 60% Increase in requirements stability
- 55% Improvement in defect removal efficiency (DRE)
- 40% Reduction in rework
- 80% increase in cost and schedule estimation accuracy and predictability

Institutionalization: CMMI Viewpoint

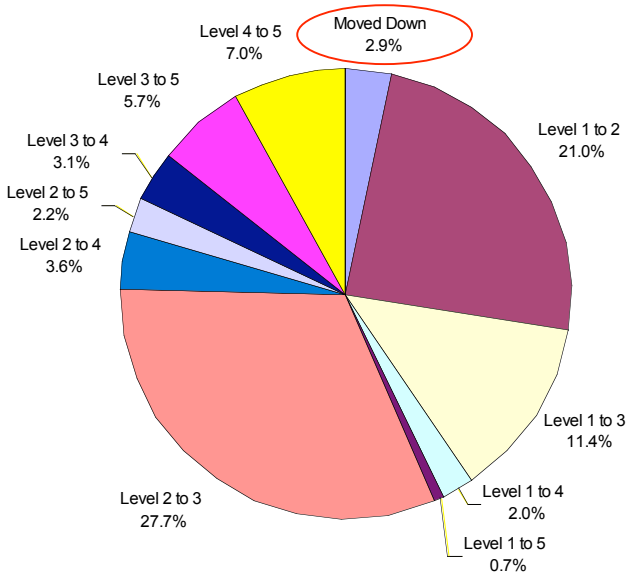
- The ingrained way of doing business that an organization follows routinely as part of its corporate culture.

CMU/SEI-2002-TR-012 Capability Maturity Model® Integration (CMMI[sm]), Version 1.1 (Staged Representation). Appendix C Glossary, page 579

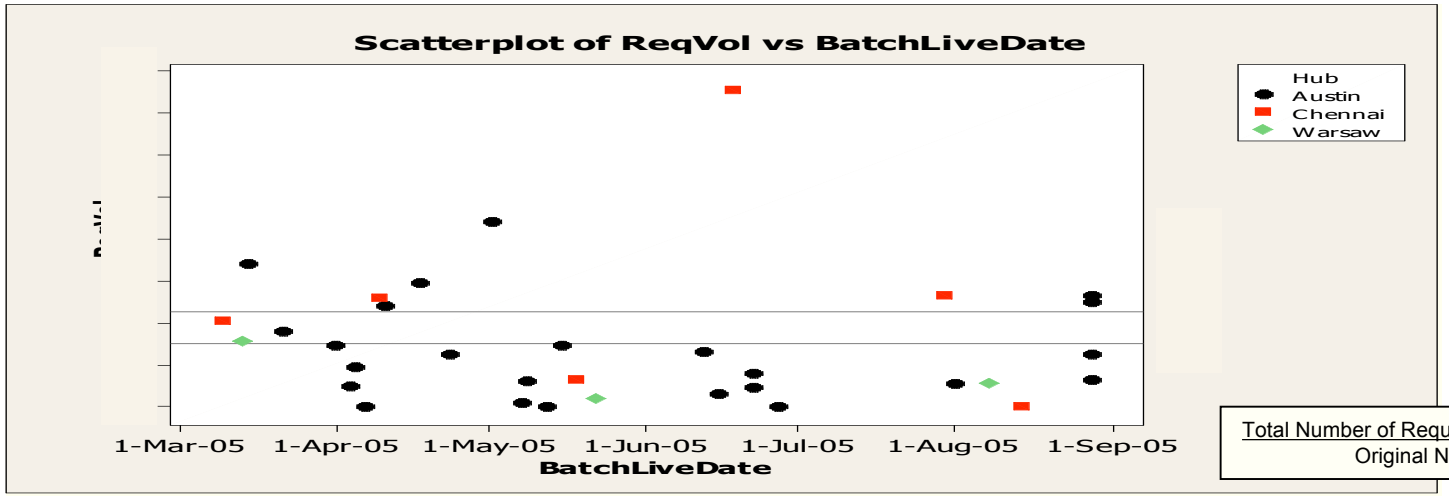
- In CMMI appraisals, institutionalization is judged by achievement of generic goals at the appropriate capability level / maturity level.

ARC Definition

Reappraisals – Change in Maturity Level
SEI Process Maturity Profile
September 2005

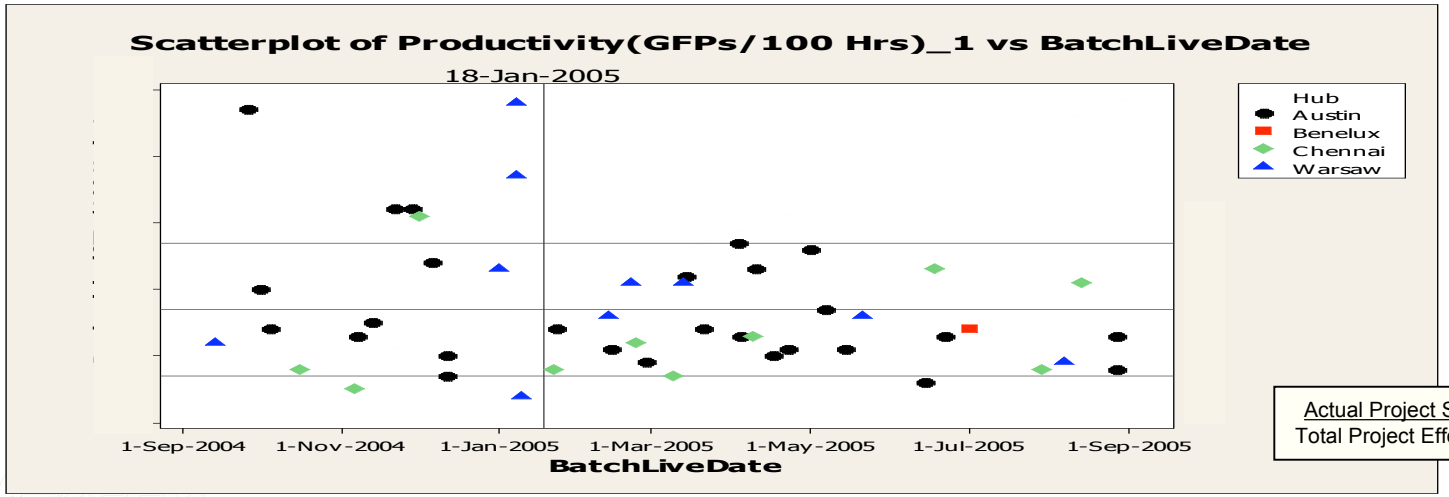


Is All What It Seems?: Process Stability and Capability



Process is Not Stable and Not Capable

Total Number of Requirements Changed, Added, Deleted
Original Number of Requirements



Process has become Stable and Capable

Actual Project Size (GFPs)
Total Project Effort (100 Hrs)

Institutionalization: Alternative Viewpoints

- Conscious Competence Learning Model

  '*There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. There are things we don't know we don't know.'*

  - Donald Rumsfeld

- Mental Models

  'The Map is not the territory'

  - Alford Korzybski

  - Theory of Actions
  - Single and Double Loop Learning

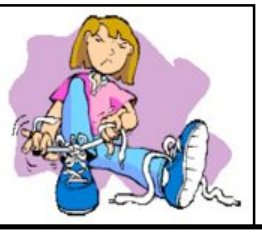
- Systems Thinking

  'Every man takes the limits of his own field of vision for the limits of the world '

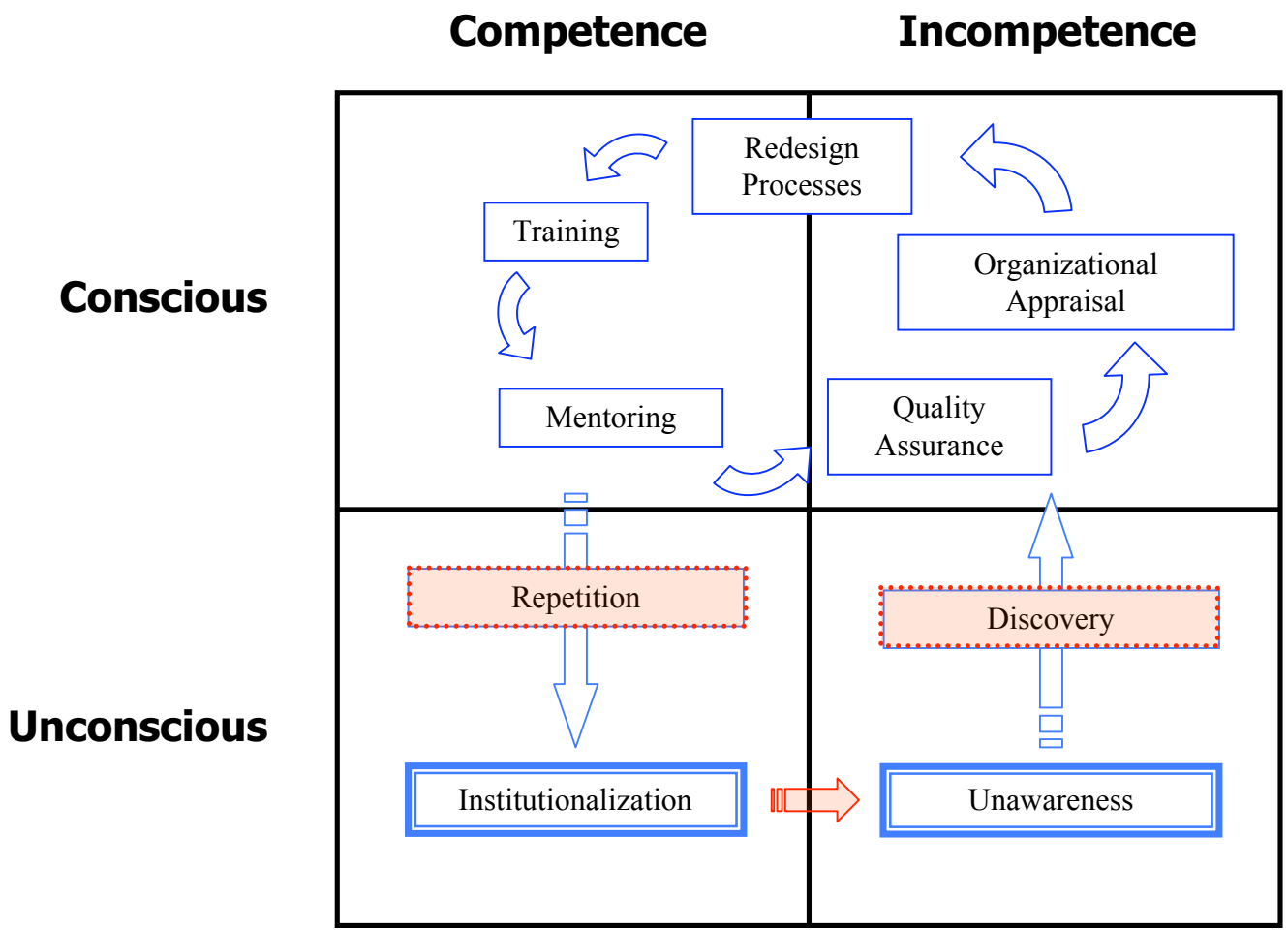
  - Arthur Schopenhauer

  - Systems Mapping
  - Leverage Points

Conscious Competence Learning Matrix

	Competence	Incompetence
Conscious	Can manage to tie them perfectly, but needs to concentrate each time on the process. 	After falling over a few times recognises that shoelaces should be tied but does not know how to do it. 
Unconscious	 Is able to tie her laces without consciously paying any attention to the process.	 Blissfully unaware that anything is wrong or that tying her shoelaces has any benefits

Applicability to Process Improvement

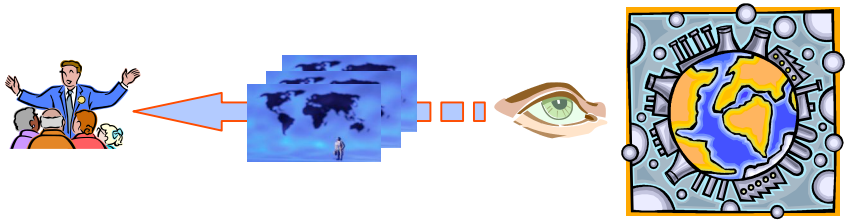


Mental Models: The Theory of Actions

Espoused Theory

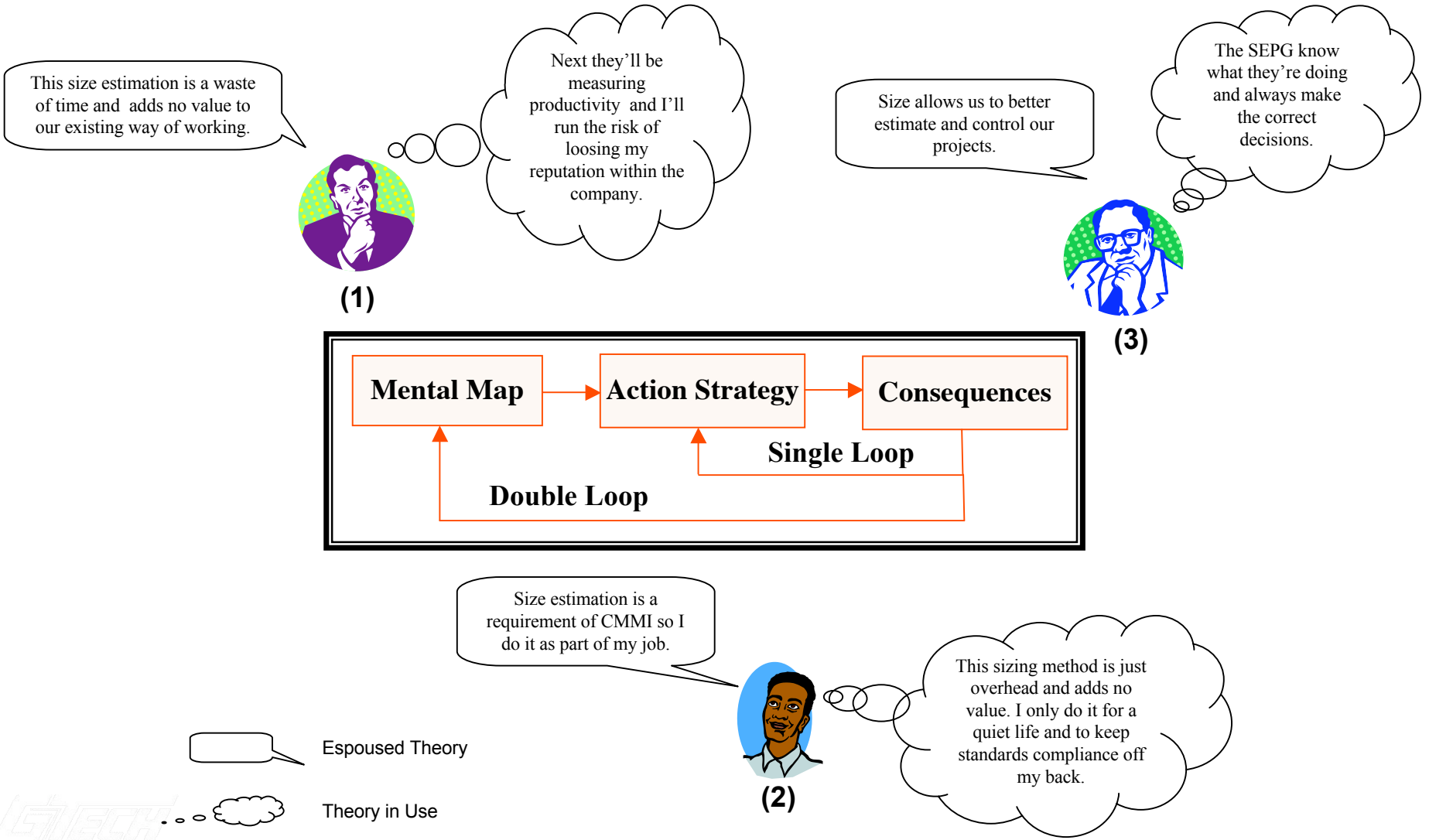
- The world view and values people and organizations believe their behaviour is based upon.
- Derived from politically correct values an individual or organisation wants others to accept as its guiding principles, governance, or social responsibility.

Theory-in-Use

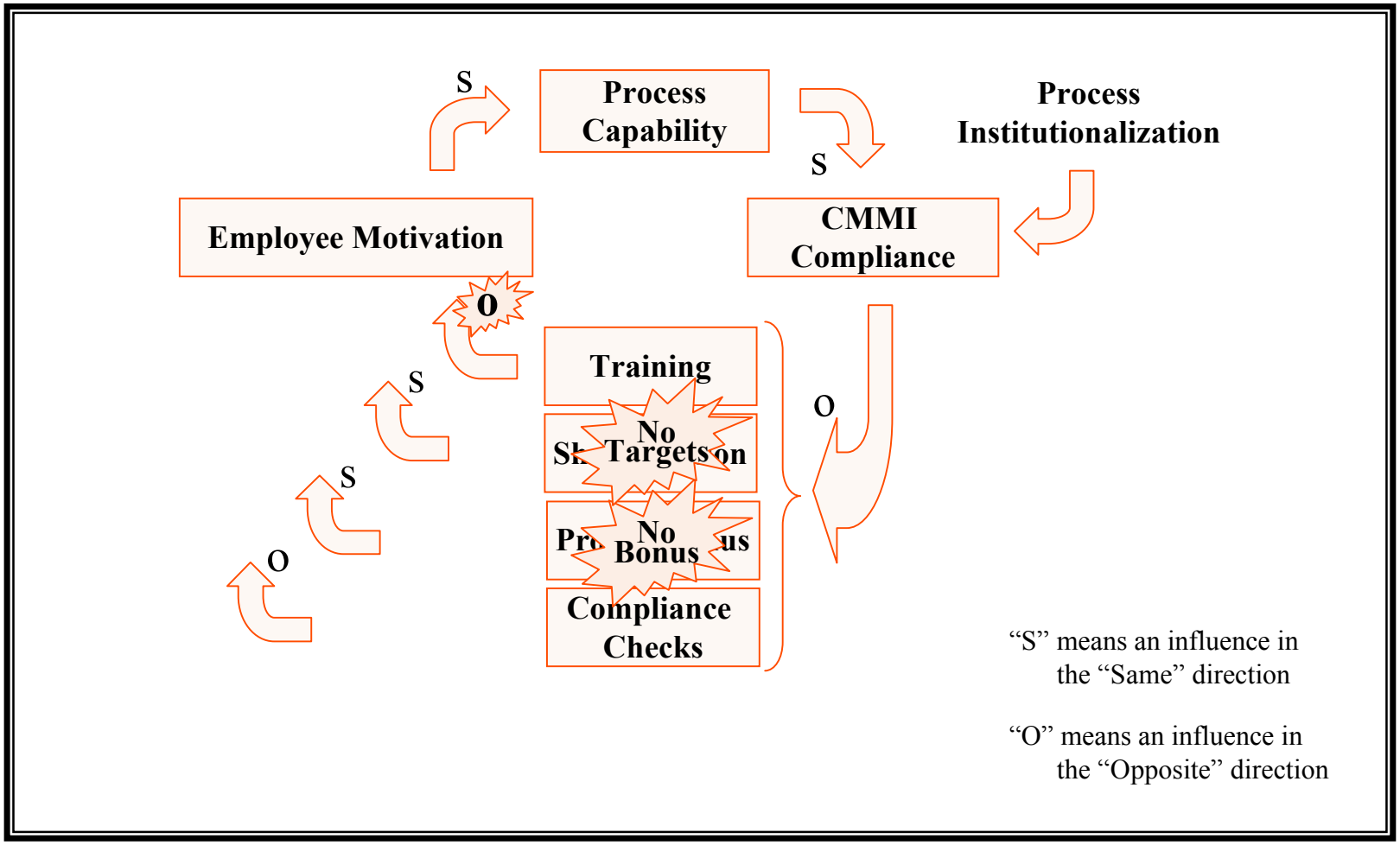


- The world view and values implied by the behaviour of a person or organization.
- Determined by the unconscious ‘maps’ or ‘ mental models’ that filter feedback and reinforce actions that conform with the model and sabotage those in conflict with it.

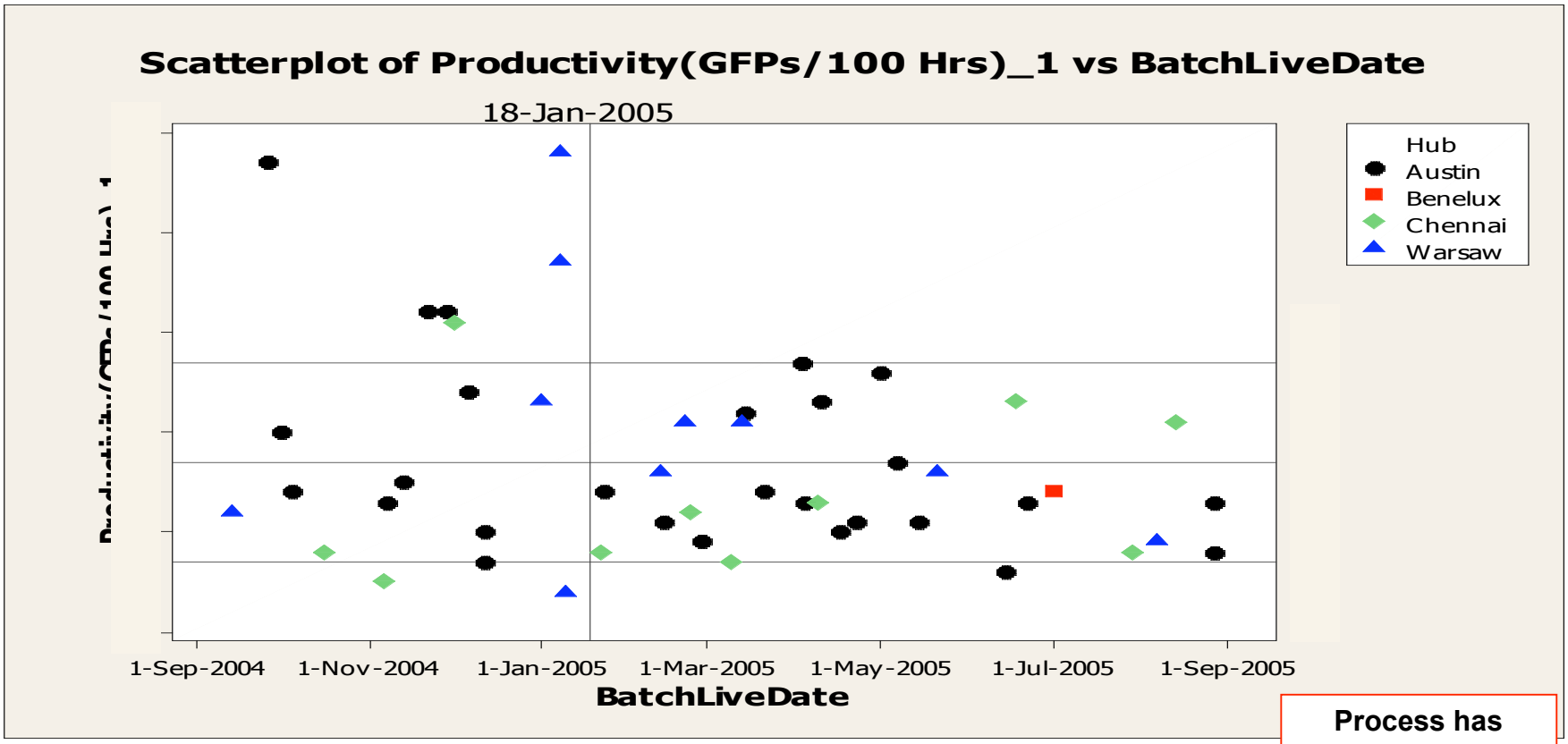
Institutionalization: Theory of Actions and Learning



System Mapping: Process Improvement



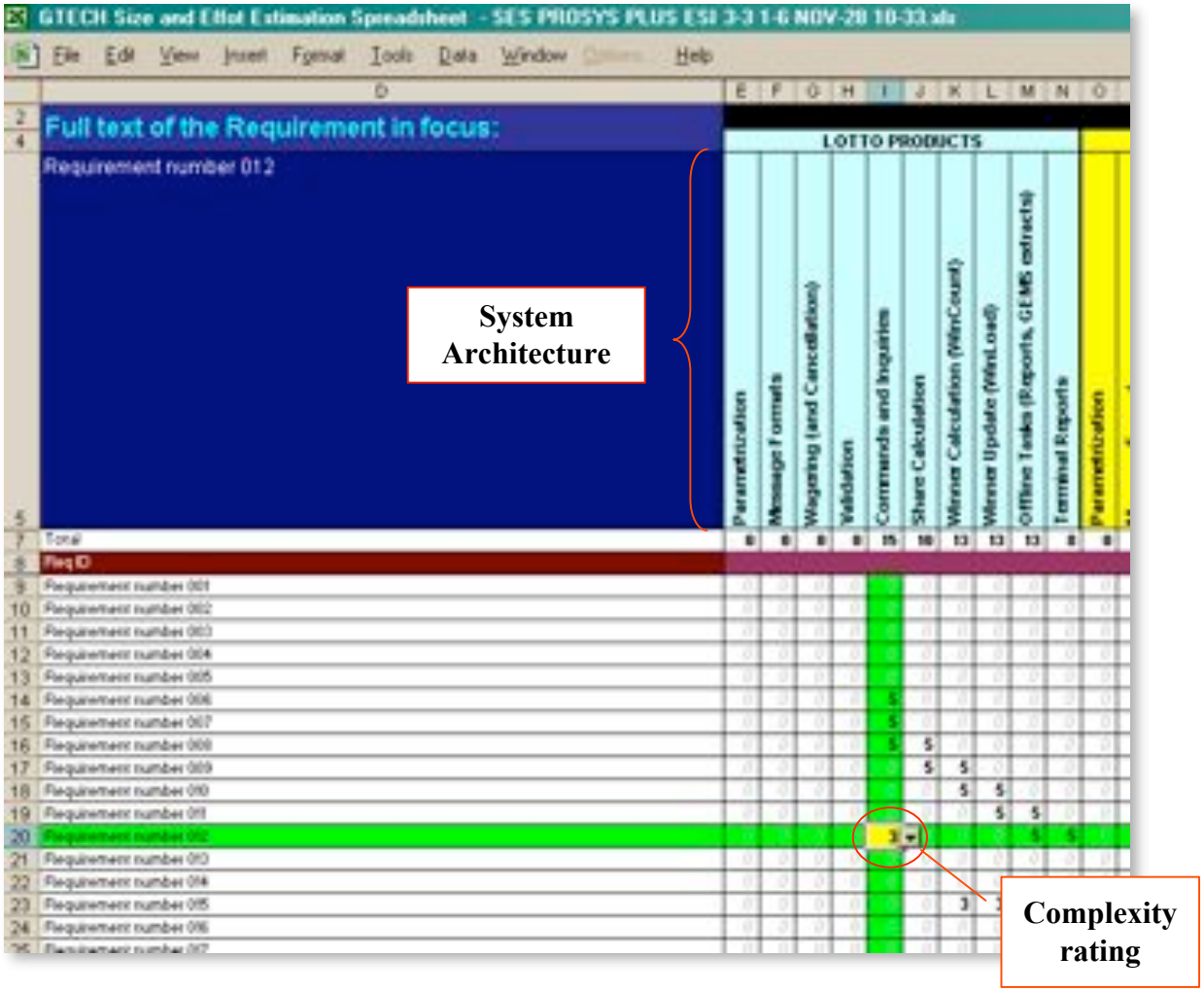
Size Estimation: So What Went Right?



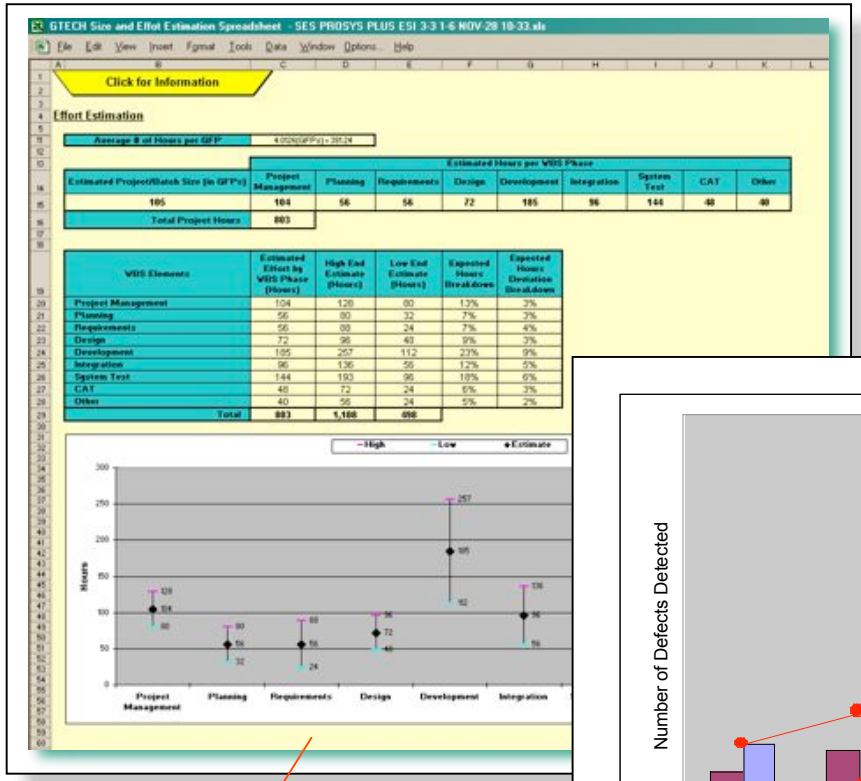
Process has become Stable and Capable

June 2002: Introduction of Size Estimation Methodology

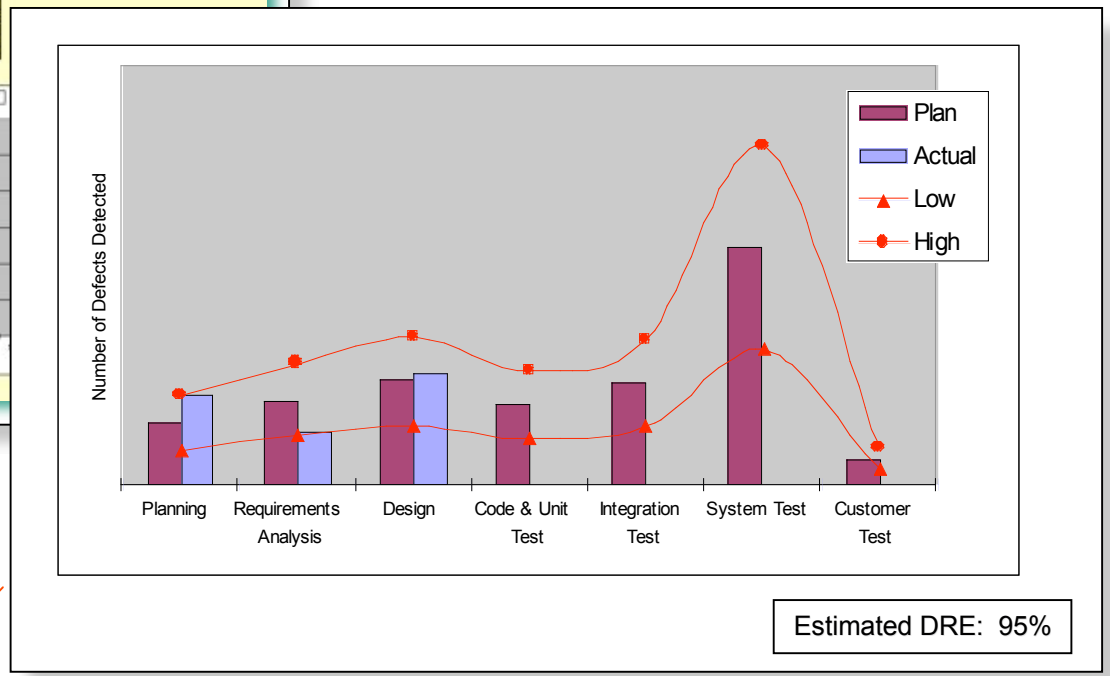
- June 2002 GTECH Function Points (GFP) introduced.
- Excel based tool.
- Estimation responsibility of project manager but typically delegated to design personnel.



November 2004: Standard Project Process (SPP) Version 2.2



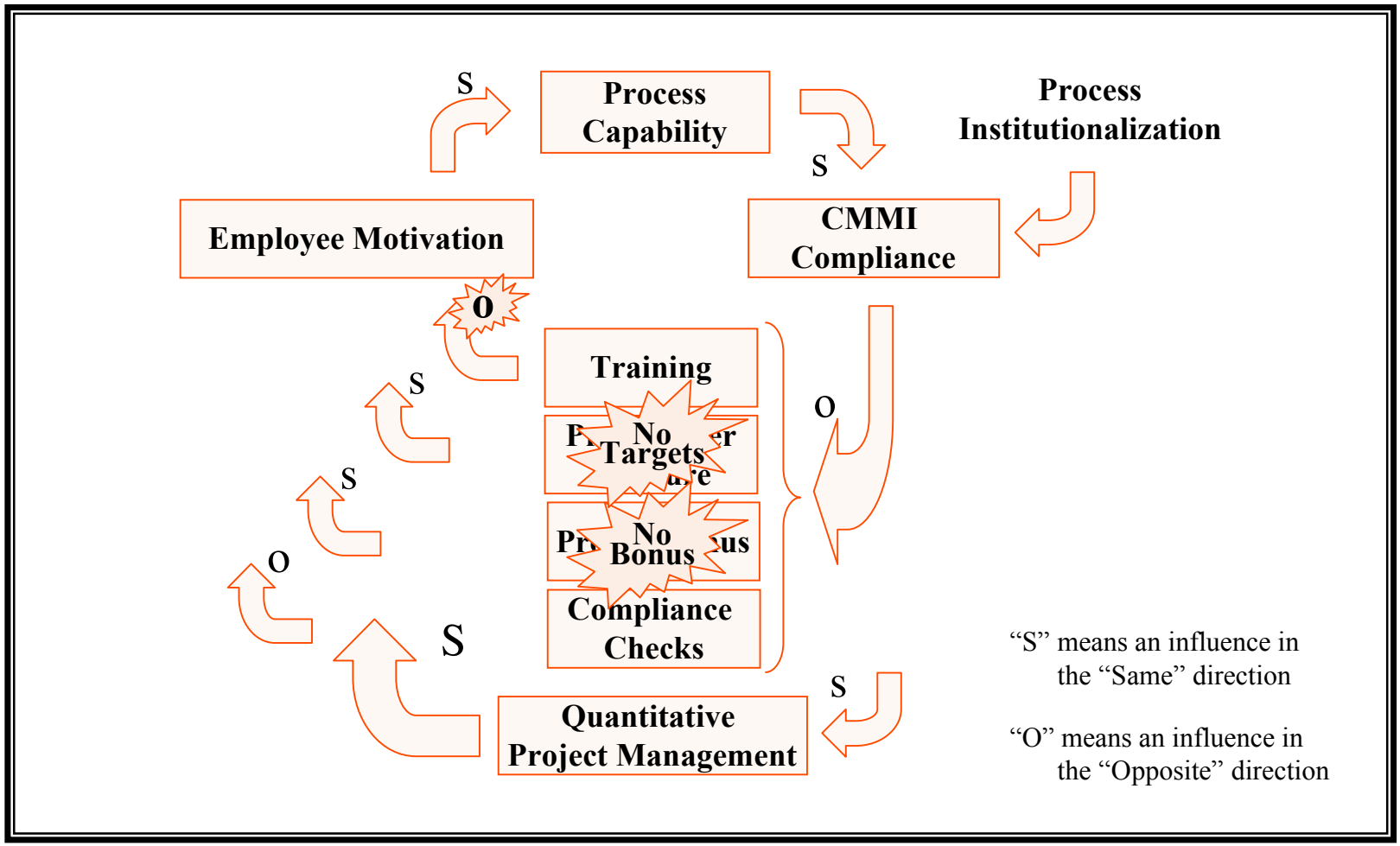
Effort Estimation



Defect Profile

- Version 2.2 of SPP released in November 2004 and contained for the first time size based estimation utilities.

System Mapping: Sizing Process



Size Estimation – So What Went Right?

- The concept of software size estimation is not intuitive for most technical personnel.
  - Individuals, teams, and organizations operate within the unconscious incompetence zone of the learning matrix.
  - Training is ineffective in this situation. What is required is recognition of the relevance of the skill area being taught, and an awareness that a skill deficiency exists.
- Even where such conditions existed unsupportive mental models were impeding the institutionalization of the sizing methodology.
  - Size estimation was perceived as bureaucratic and not seen as necessary by 'experienced' technical personnel.
  - The new method challenged the standing of senior technical personnel who traditionally provided estimates based upon 'expert judgment'.
  - Sizing was perceived as a management tool to enable productivity comparisons and to enforce accountability.
  - At best sizing was perceived to produce data for 'post mortem' investigations by which time practitioners were already working on their next project.
- Introduction of the size based utilities produced dramatic results because:
  - Benefits of size estimation became visible to all and surfaced unconscious incompetence.
  - Size estimation was reframed from bureaucratic overhead to a professionally justified element of the technical engineering function.
  - The new method was now seen to be complementary to 'expert judgement' estimation and not a threat.
  - New utilities made 'real time' benefits visible at the individual, team, and organizational level.
  - Productivity was measured and reported was seen to be non-attributable to individuals or teams.

Take Home Thoughts

- When implementing process change select methods appropriate to the position of the people, teams, and organization on the learning matrix.
- People and organizations have mental models which drive behavior. These models are usually unconscious and self-protect against change.
- To institutionalize effective and sustainable change the mental models need to be updated to drive the required behavior.
- Change agents should practice a systemic approach to problem solving wherein a organization is analyzed as a whole rather than focusing in on individual component parts.
- Consideration should be given that cause and effect tend not to be closely related in time and space and are often counter-intuitive.
- Small changes can produce big results via the identification of leverage points.
- Even expert change agents have areas of unconscious incompetence and are constrained by the blind-spots in their mental models.

Thank You

Any Questions

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Sources and Further Reading (Part One)

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Sources and Further Reading (Part Two)

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