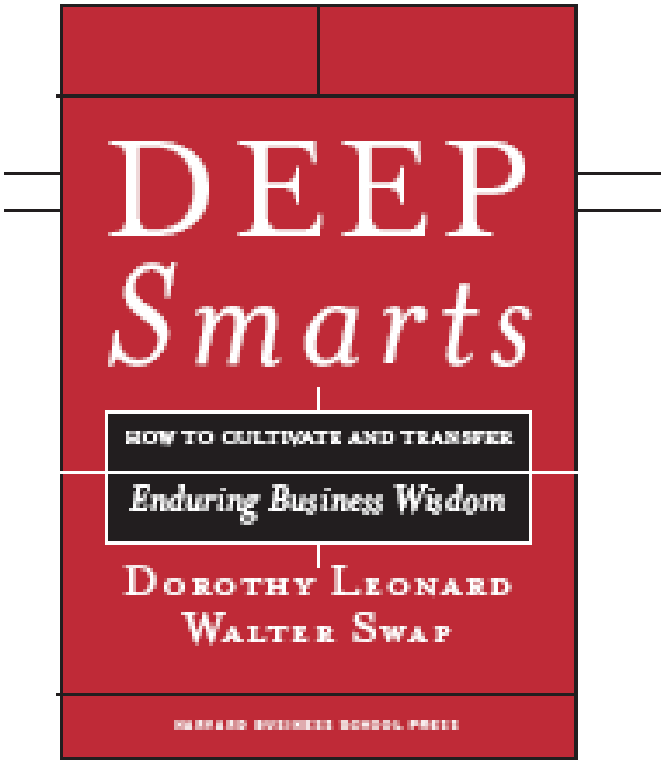
Deep Smarts: Experience-based Wisdom

21st ANZAM Conference
Sydney, Australia
December 7, 2007



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Boston, Massachusetts, USA

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Agenda

- **What are Deep Smarts?**
- Relevance to business
- Description of Research Program
- Recreating/"transferring" Deep Smarts
- Current Research

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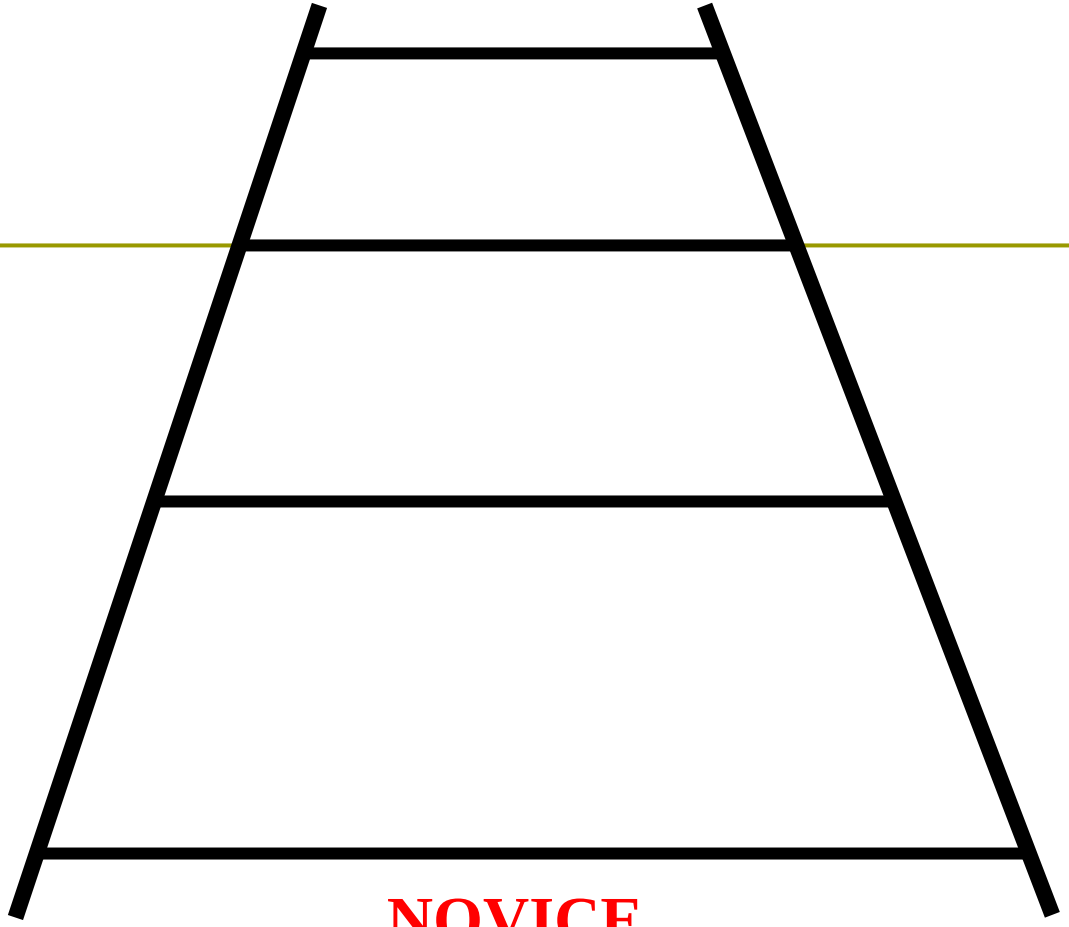

NOVICE
(Beginner)

Ladder of Expertise (Deep Smarts)

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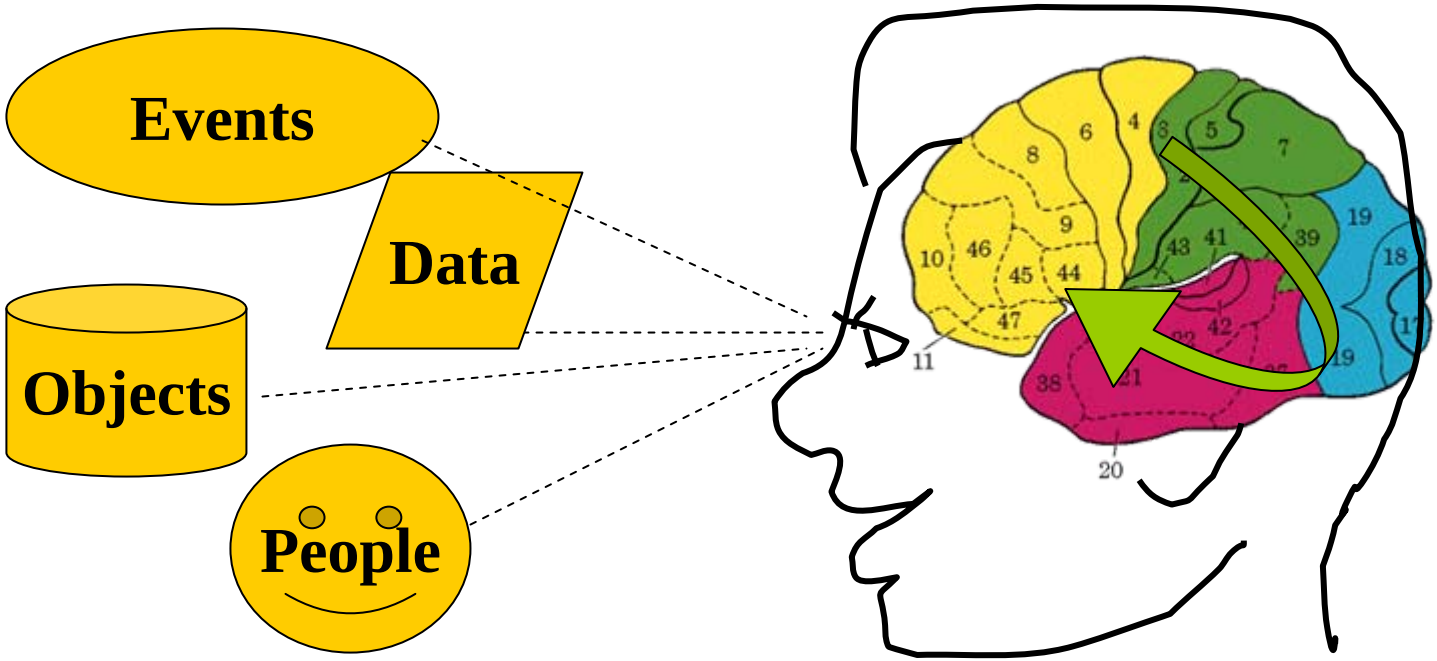
Information Becomes Knowledge When…

It connects with our experience (what we know)!



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Just Information (to me)…

- "Did you see the build I rezzed today? I'll give you a teleport to the sim. I used only a few prims so I wouldn't cause much

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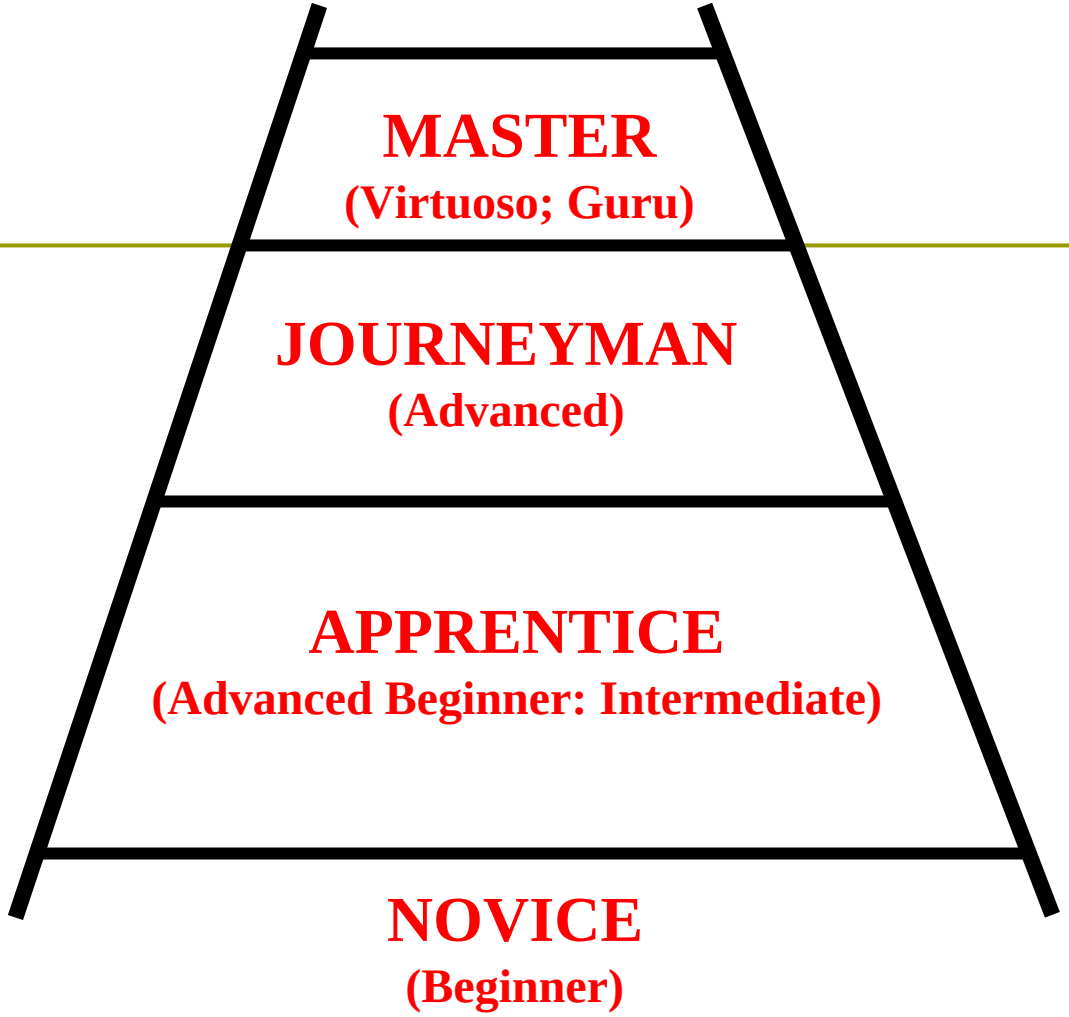

Ladder of Expertise (Deep Smarts)

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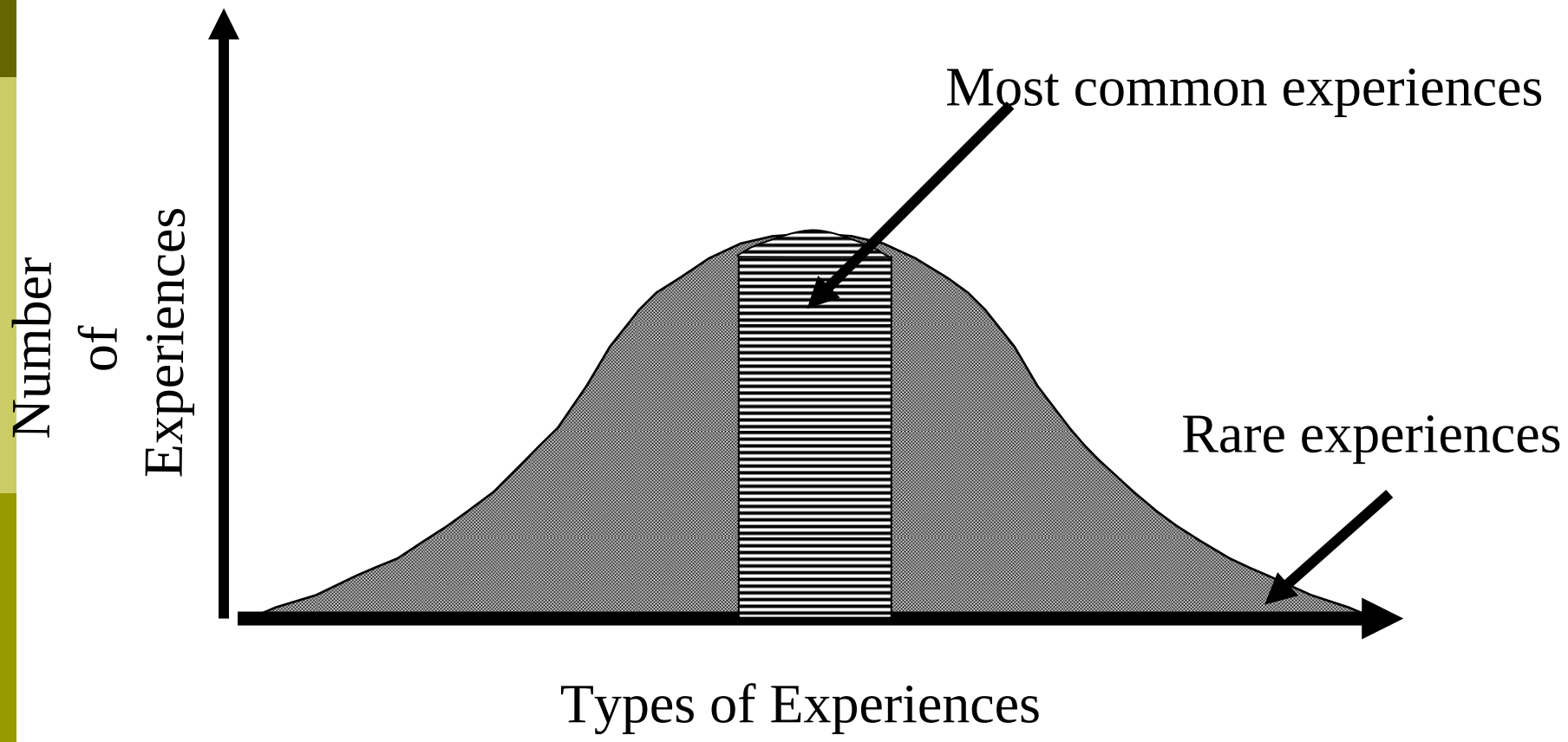
Distribution of Experiences



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A Few Differences Between Experts and Novices

	Experts	Novices	Limitations
Speed of Decision-Making	Make decisions swiftly, efficiently, without reviewing basic facts	Need to review all facts, choose among alternatives	Over-confidence; expert may ignore relevant data
Context	Take context into account: knowledge is “contextualized”	Rely on rules of thumb that minimize context	Difficult to transfer contextualized knowledge
Tacit Knowledge	Extensive tacit knowledge drives decision making	Knowledge is largely explicit	Difficult to access tacit knowledge, so transfer difficult
Pattern-recognition ability	Have large inventory of patterns drawn from experience	Limited experience constrains number of patterns	When no patterns exist, expert may be no better than novice

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The (Original) Seven Dimensions of Deep Smarts

1. **Skills & Know-how** essential to the organization
2. **System thinking** (Knowledge of big picture to details; interactions & consequences)
3. **Separation of Signal from Noise** (Focus on relevant data & behaviors)
4. **Swift, Wise Decision-Making** (Rapid sorting of alternatives, potential results)
5. **Ability to take Context into Account** (Understanding commonality, differences)
6. **Networks** (Knowledge once-removed)
7. **Pattern Recognition** (Matching to known situations, processes, phenomena)

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Shaping Deep Smarts

Knowledge Framing:
Beliefs and Assumptions
(Chapter 5)

Knowledge Filtering:
Social Influences
(Chapter 6)

Internal Influences: (Self)

External Influences: (Other People)

Knowledge Building:
Experience and Expertise
(Chapters 2 ,3 and 4)

Knowledge Transferring:
Coaching and Guided Experience

Acquiring Deep Smarts

The Role of Knowledge in Cultivating and Transferring Deep Smarts

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Deep Smarts are an essential part of Core Capabilities

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- Much organizational capability is in the heads and hands of key individuals—their deep smarts.
- Some deep smarts are useless or even dangerous; but many are essential for success.
- Baby boomers are retiring. Hired-back consultants are not transferring knowledge.
- Our culture encourages “sink or swim” job transitions, so experience, tacit knowledge lost.
- Most organizational learning systems are not designed to develop experience-based knowledge.

Therefore: a need to understand how to identify, nurture, and transfer experience-based knowledge.

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Costs of Losing Deep Smarts

- IT company out-sources computer-support overseas and lays off a key employee who had saved them “tens of thousands of dollars” when their systems crashed.

- Rolls Royce figures retirement of trouble-shooter costs $400,000 in first year alone.

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You Can't Learn to Climb a Telephone Pole Online

- Telecommunications Company: To learn how to install and fix equipment, employees must "experience situations in the field."
- Home Depot (Do-it-yourself stores): "There's no substitute for having skilled tradespeople in the aisles;" Selling requires knowing the products, explaining them clearly and discerning customer wants.

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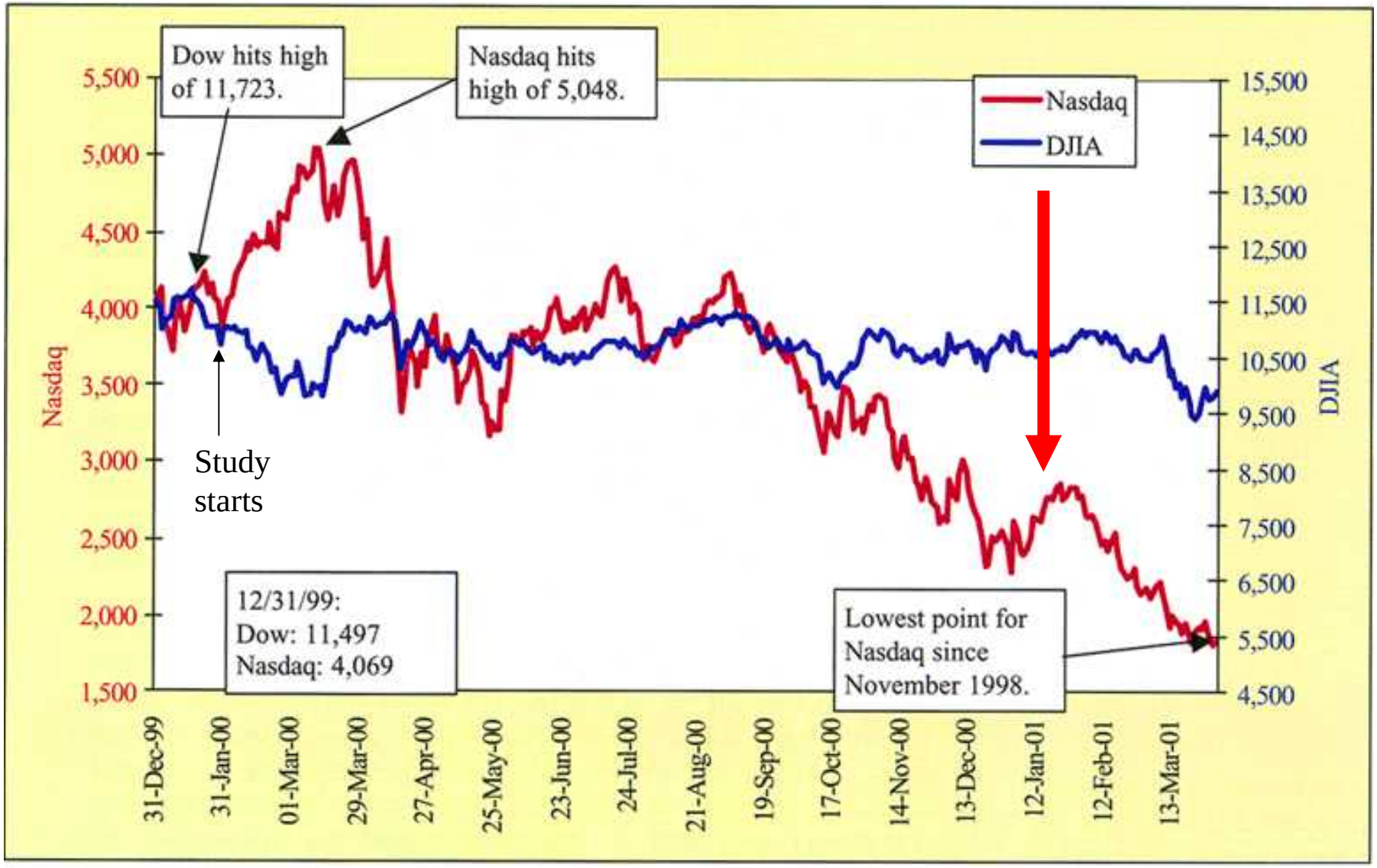
Research basis for *Deep Smarts*

2000: First Wave

- **U.S and Asia: India, Singapore, Hong Kong: 125 individuals:**
  - **Mentor Capitalists, Venture Capitalists, Incubator managers, paired with the Entrepreneurs/Teams being coached in 35 companies, plus informants in industry**
- **Longitudinal studies: One VC-coached, One MC-coached companies**
- **In-depth HBS case studies: One Incubator, Two VC-backed startups, One MC-backed startup (A and B cases)**

The Bubble Bursts



Source: Hammond Associates, 2001

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2001: Second Wave

- **U.S. and Asia: interviews in same 35 companies, with Coaches and Entrepreneurs**

2002-3: Detailed case studies of knowledge transfer in large, established organizations, e.g., NASA/JPL, Best Buy, Whirlpool

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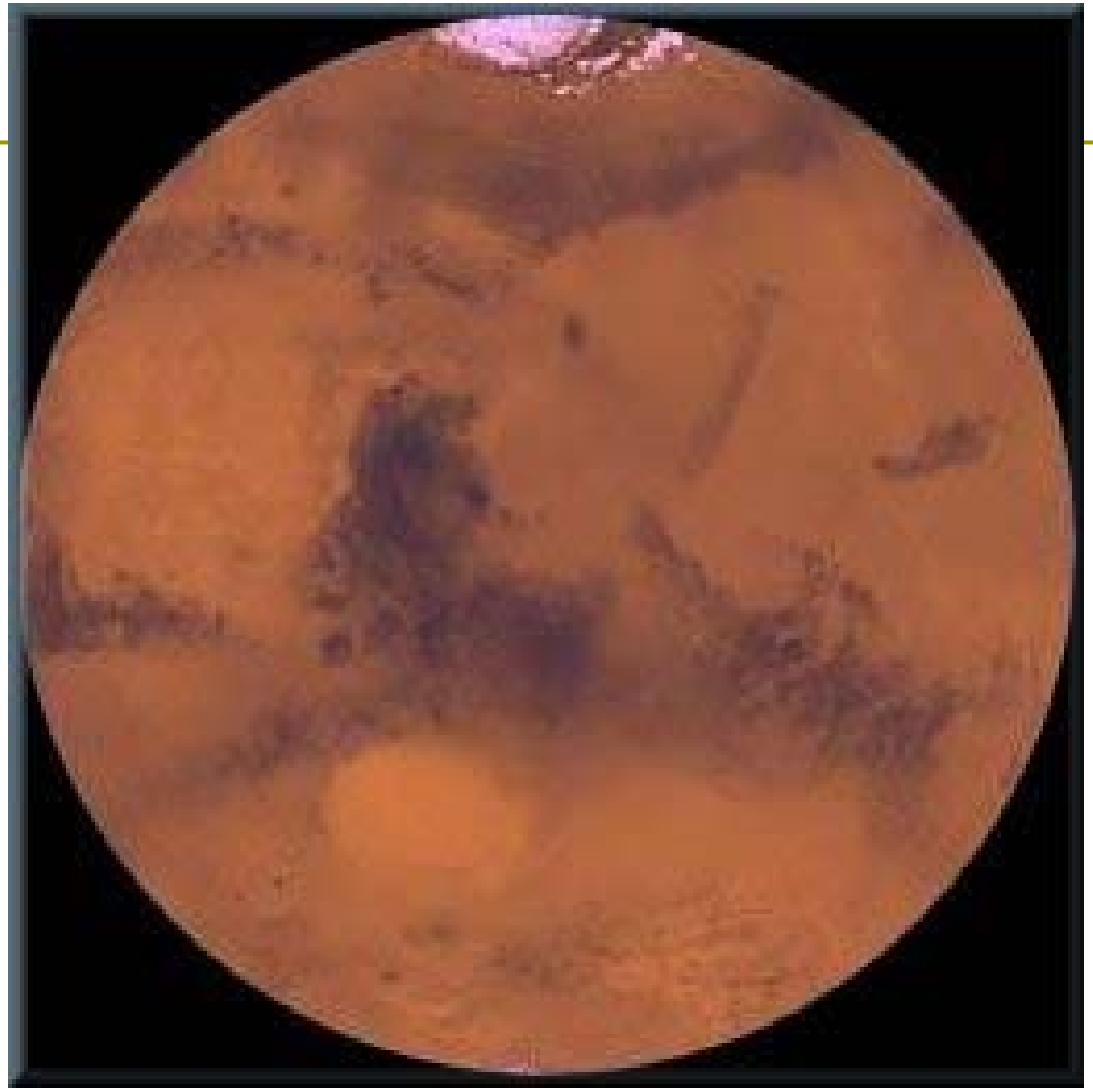
NASA'S Mission to Mars



1997: Great Success

1999: 4 Failures

"Dot-gone Syndrome"

Too many junior mgrs

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Post-Publication Research on *Deep Smarts*

2000: First Wave

- **35 startup companies in U.S. and Asia, where entrepreneurs being helped by experienced 'knowledge coaches.'**
- **Longitudinal studies over a couple years, observing the coaches in action in 2 small companies.**
- **Several in-depth case studies**

2001: Second Wave

- **Same companies, entrepreneurs and coaches: 'what have you learned?'**

2002: Third Wave

- **Studies in large organizations of the transfer of Deep Smarts**

2004-2006 Further Research on Deep Smarts:

Raytheon, Large Software Company, U.S.Forest Service

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Research on DS at Large Software Company

- Upper managers nominate two groups of people:
  - Those who fit the DS profile
  - Those who do not fit the DS profile
  - Matched in age and experience
- DL and WS conduct 1.5-2 hour interviews with 20 individuals
  - Interviewers did *not* know which group the interviewees fell into
  - 11 interviews were in person; 9 by telephone
- Interviews with peers & direct supervisors

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Addition of Two Dimensions of Deep Smarts

1. Skills & Know-how essential to the organisation
2. System thinking
3. Wise Decision-making
4. Ability to take Context into Account
5. Networks
6. Distinguishing Signal from Noise
7. Pattern Recognition
8. Ability to Deal with Novelty (Open-mindedness)
9. Enthusiasm/Passion for the knowledge domain

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Limitations of the Research at LSC

- Small sample
- Self-nominated, rather than other-identified knowledge domain
- Individuals unable to evaluate self
- Too few items to measure some DS dimensions
- Not as many years of experience as we wished (9-10 in the industry; 3-4 in LSC).

Confirmatory Research with Wildland Fire Management Teams

- 20 interviews with highly experienced fire behavior specialists
- Nine dimensions confirmed
- Data analysis still on-going

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Memorable Experiences Underlie Deep Smarts (and memory is tied to emotion)

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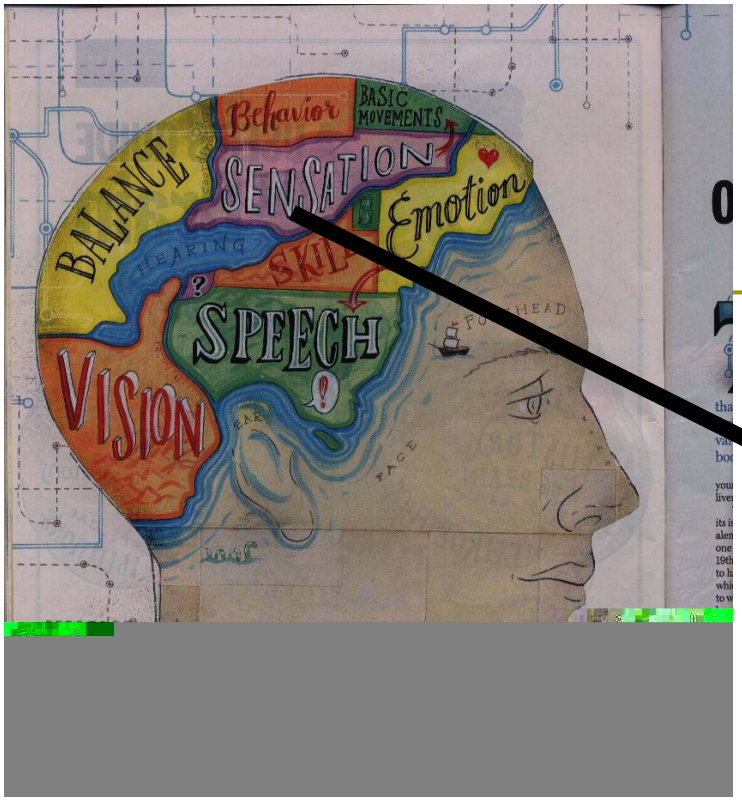
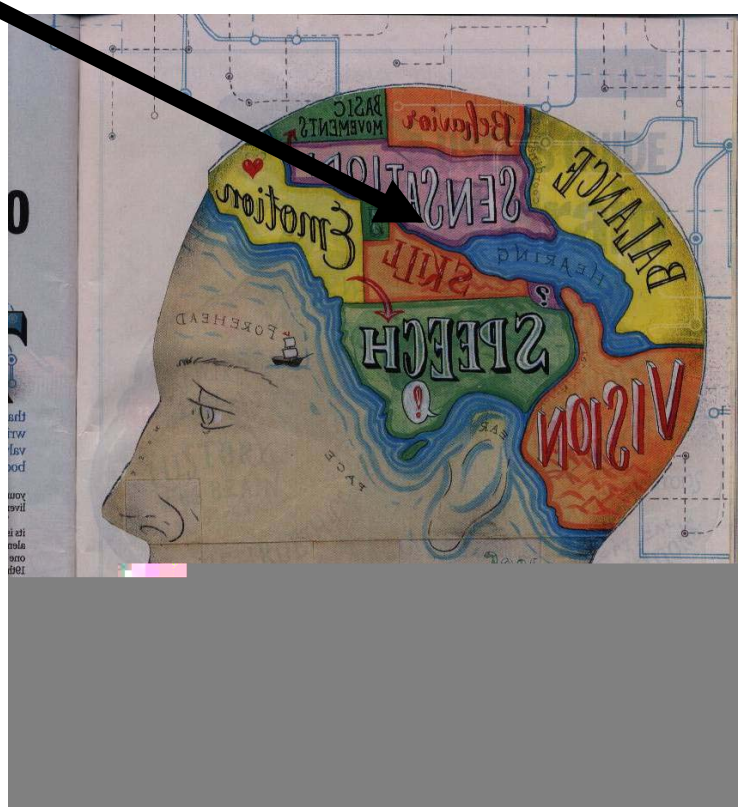


So HOW can Deep Smarts Be Transferred?



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Transferring Expertise

"I often wish that what I had in my head I could give to my sons, but I can't. They have to learn it the same way I did."

67-year-old Ted Ames, Lobsterman in Stonington, Maine. Expert about cod. Given McArthur "genius" award because of his research.

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Modes of Knowledge Transfer

Active Learning

Increasing Growth of Deep Smarts

Passive Reception

Socratic Questioning
Stories with a Moral
Rules of Thumb
Directives, Presentations, Lectures

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What makes memories stick?*

Effort	Rehearsal and repetition with a list of items to be remembered.	*Good*
Organization	Analysis using frameworks, schema, and concepts.	*Better*
Discovery	Iteration over a range of hypotheses; generation and selection among alternatives.	
Aha!	Initial confusion, active cognitive struggle, creation of alternatives and finally, surprise.	*Best*

* Leonard, Dorothy A., and Brian DeLacey, 2002

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Modes of Knowledge Transfer

Active Learning

Increasing Growth of Deep Smarts

Passive Reception

- **Learning by Doing**
  Guided Experience:
  - ***Guided Practice***
  - ***Guided Problem-solving***
  - ***Guided Observation***
- Socratic Questioning
- Stories with a Moral
- Rules of Thumb
- Directives/Presentations/Lectures

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Two Types of Observation

- Shadowing
- Mind-stretching Exposure

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Increasing Growth of Deep Smarts

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  - ***Guided Experimentation***
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Different Models of Knowledge Transfer

- NASA/JPL
  - Multiple experts, one protégé
  - Nomination or self-selection of protégés
  - Diverse mentoring styles and approaches

- Raytheon:
  - One expert, multiple protégés
  - Selection of both by senior mgmt
  - A process coach
  - Diverse coaching styles and approaches

Neither program teaches the coaches *how to transfer knowledge*

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Current Research

*Personality	Motivation	Know-what
*(Also based at least partially on **experience**)* •Persistence in Problem-Solving •Self-confidence	Passion & Enthusiasm for Knowledge Domain	Equipment Competitors Markets

KNOW-HOW

•System Thinking

•Separation of Signal from Noise

•Swift, Wise Decision-Making

•Ability to take Context into Account

•Networks

•*Ability to Manage Novelty (Recognition of differences; open to experimentation)

•****Diagnostic Capability + Extrapolation*** (Questions & hypotheses yield cues that in turn suggest non-obvious operational/management problems.)

•Pattern Recognition (Diagnosis leads to matching with prior experience.)

**Added from recent research on Deep Smarts*

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Next Steps in Research Program

- Creation of separate Managerial/Technical DS surveys
- Testing of both in organizations
- Further exploration about Diagnostic Capability
- Reports/invitations to associates on dorothyleonard.com

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Application of Deep Smarts Research

Identification	Design of Transfer Program	Execution of Transfer Program	Evaluation
DS **Potential DS**	**DS Codification** **Guided Experience**	**HR Involvement** **Coaching the Coaches**	**Metrics**