Facilitating Innovation and Creativity in a Team Environment

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Workshop Layout

- Welcome & Overview
- Innovation and Creativity
  - What are the key features?
  - How do we cultivate?
- Innovation and Creativity in a Team Environment
  - High performance teamwork
  - IDEO example
- Wrap-up and Next Steps

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Session Objectives

- Participants will be able to describe key elements of:
  - Importance and features of high performance teamwork for fostering innovation and creativity
  - IDEO approach to innovation and creativity
- Participants will begin applying key elements to the design/re-design of a course, lab or class session or learning module

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Innovation and Creativity

- Individually reflect on
  - Key features and how to cultivate innovation and creativity in a team environment
  - Record your ideas
- Turn to the person next to you
  - Exchange ideas
  - Develop a list to share with whole group
- Whole Group discussion

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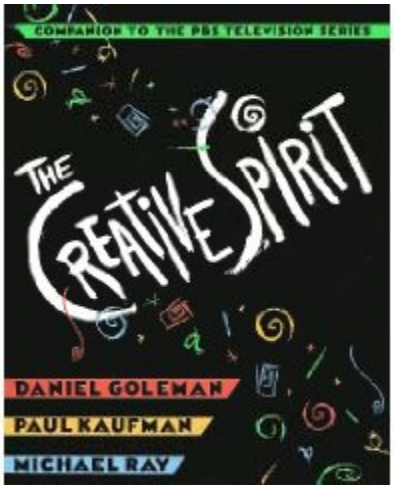
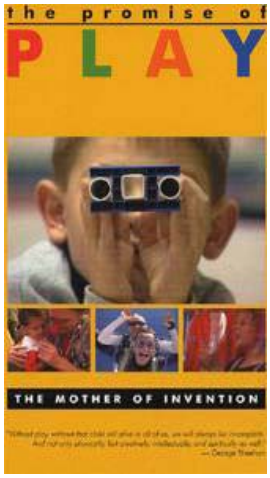


http://www.amazon.com/Creative-Spirit-2Tie-PBS/dp/0525933549

http://www.danielgoleman.info/blog/

http://www.michael-ray.com/



http://www.amazon.com/PROMISE-PLAY-Part-Mother-Invention/dp/B0018L45MO/ref=pd_bxgy_d_text_b

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Guide to Increasing Innovation Amabile & Khaire (2008)

- If you're trying to enhance creativity:
  - Remember that you are not the sole fount of ideas
  - Enable collaboration
  - Enhance diversity
  - Map the stages of creativity and attend to their different needs
  - Accept the inevitability and utility of failure
  - Motivate with intellectual challenge

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PLAYBOOK: BEST-PRACTICE IDEAS

Ideas from the Innovators

Take a page from some of the world's most respected creative companies:

Bring them together
BMW relocates between 200 and 300 engineers, designers, and managers to its central research and innovation center to design cars. **Face-to-face teams reduce late-stage conflicts and speed development times.**

Think traits as well as numbers
Tracking innovation results is crucial for any growth-focused company. **But when evaluating managers, subjective metrics, such as risk tolerance or GE's measure of "imagination and courage," can be a better way.**

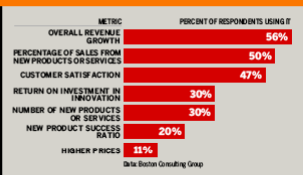
Make a seat at the table
Infosys **selects nine employees under 30 each year to participate in its senior management sessions.** These young guns present their ideas for new services and ways to improve the company's processes.

Preserve oral traditions
Old-timers at 3M are expected to **hand down tales of the company's long innovation tradition** to new engineers. Before long, every new 3Mer can quote the philosophies of former CEO William McKnight.

Get involved on the ground
Research In Motion co-CEO Mike Lazaridis personally heads engineering teams and hosts weekly innovation-themed "vision" sessions to excite the troops. **A culture of innovation starts from the top.**

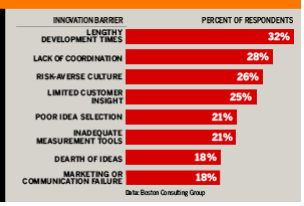
Clear Facts for a Hazy Process

Companies frequently use overly broad methods to measure innovation success



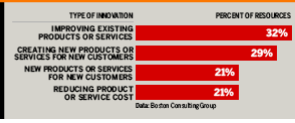
The Enemies of Innovation

Ideas are easy. The toughest obstacles, said our respondents, are developing speed and coordination



Where Innovation Resources Are Going

The largest share of time and money goes to incremental innovation, respondents say



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A Global Pulse of Innovation

Apple and Google reign worldwide. But respondents from different regions often favored local companies.*

ASIA-PACIFIC		EUROPE		NORTH AMERICA	
1 Apple	9 Nokia	1 Apple	9 GE	1 Apple	9 IBM
2 Google	10 Infosys	2 Google	10 eBay	2 Google	10 Dell
3 3M	11 Virgin	3 Nokia	11 IKEA	3 P&G	11 Wal-Mart
4 Samsung	12 P&G	4 Microsoft	12 Ryan Air	4 3M	12 IDEO
5 Microsoft	13 Dell	5 3M	13 Sony	5 Toyota	13 Target
6 IBM	14 Sony	6 Toyota	14 Intel	6 GE	14 Samsung
7 GE	15 Intel	7 Virgin	15 Porsche	7 Starbucks	15 Southwest
8 Toyota		8 BMW		8 Microsoft	

Data: Boston Consulting Group *We broke ties by comparing 10-year annualized total shareholder returns. In ties between a public and a private company, the public company was favored.

The Innovation Payoff

These innovators have racked up steadily higher profit margins

http://www.businessweek.com/magazine/content/06_17/b3981401.htm

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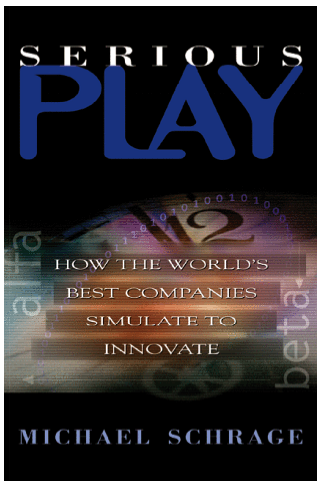
Serious Play

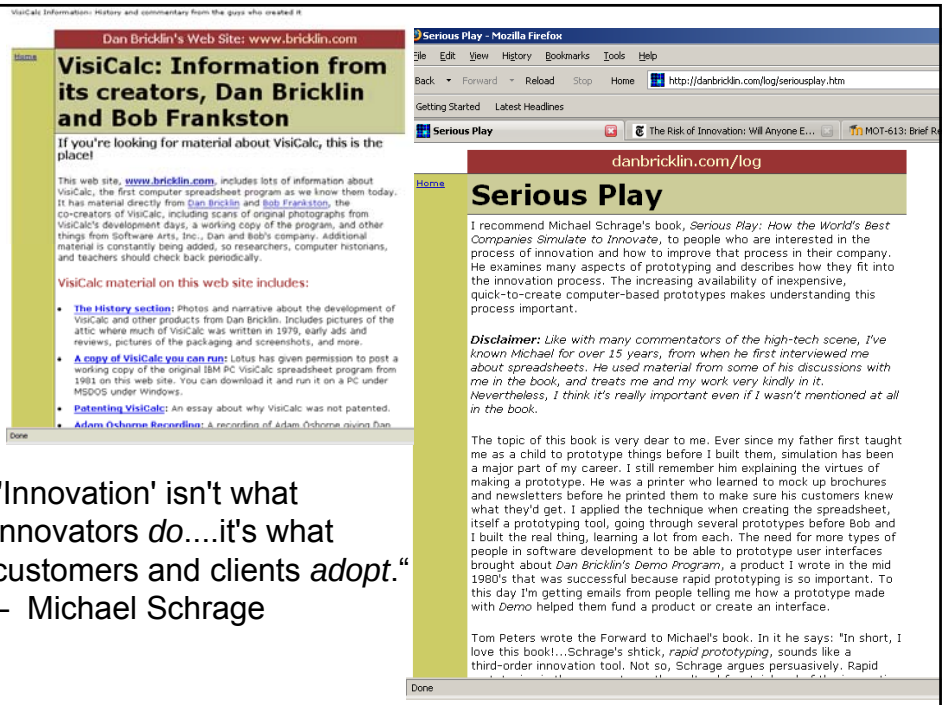


Prototyping
Innovation
Collaboration

Prototyping is probably the single most pragmatic behavior the innovative firm can practice

Innovation is more social than personal

Michael Schrage. 2000. *Serious Play: How the World's Best Companies Simulate to Innovate*

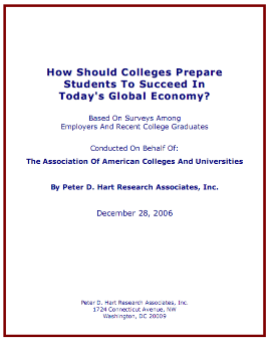


"Innovation' isn't what innovators *do*....it's what customers and clients *adopt*."
– Michael Schrage

Design team failure is usually due to failed team dynamics
(Leifer, Koseff & Lenshow, 1995).

It's the soft stuff that's hard, the hard stuff is easy
(Doug Wilde, quoted in Leifer, 1997)

Professional Skills
(Shuman, L., Besterfield-Sacre, M., and McGourty, J., "The ABET Professional Skills-Can They Be Taught? Can They Be Assessed?" *Journal of Engineering Education*, Vo. 94, No. 1, 2005, pp. 41–55.)


How Should Colleges Prepare Students To Succeed In Today's Global Economy?

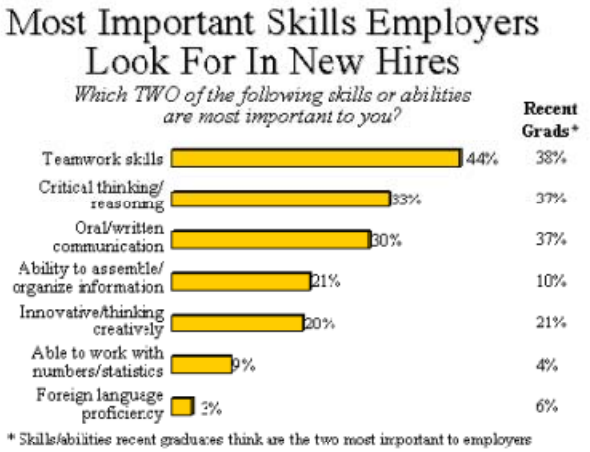
Based On Surveys Among Employers And Recent College Graduates

Conducted On Behalf Of:
The Association Of American Colleges And Universities

By Peter D. Hart Research Associates, Inc.

December 28, 2006

Peter D. Hart Research Associates, Inc.
1724 Connecticut Avenue, NW
Washington, DC 20009



http://www.aacu.org/advocacy/leap/documents/Re8097abcombined.pdf

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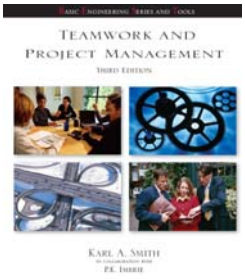
Top Three Main Engineering Work Activities

Engineering Total

- Design – 36%
- Computer applications – 31%
- Management – 29%

Civil/Architectural

- Management – 45%
- Design – 39%
- Computer applications – 20%



Burton, L., Parker, L, & LeBold, W. 1998. U.S. engineering career trends. *ASEE Prism*, *7*(9), 18-21.

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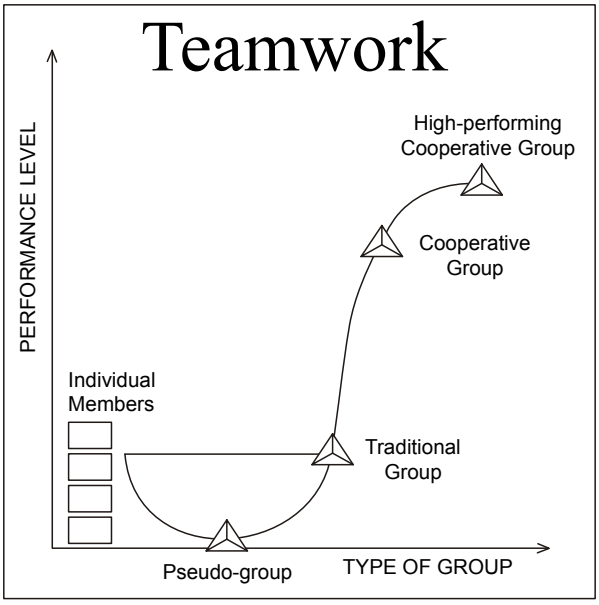

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Characteristics of Effective Teams

- ?
- ?

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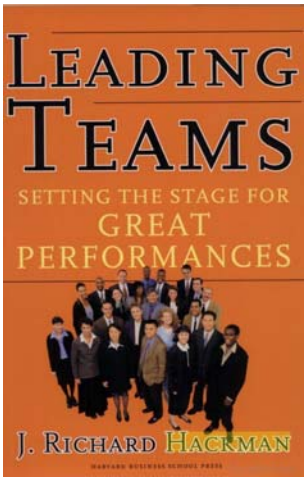
A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which they hold themselves mutually accountable

- SMALL NUMBER
- COMPLEMENTARY SKILLS
- COMMON PURPOSE & PERFORMANCE GOALS
- COMMON APPROACH
- MUTUAL ACCOUNTABILITY

--Katzenbach & Smith (1993)
The Wisdom of Teams

Hackman – Leading Teams



- Real Team
- Compelling Direction
- Enabling Structure
- Supportive Organizational Context
- Available Expert Coaching

Team Diagnostic Survey (TDS)

https://research.wjh.harvard.edu/TDS/

Real Team

- clear boundaries
- team members are interdependent for some common purpose, producing a potentially assessable outcome for which members bear collective responsibility
- at least moderate stability of membership

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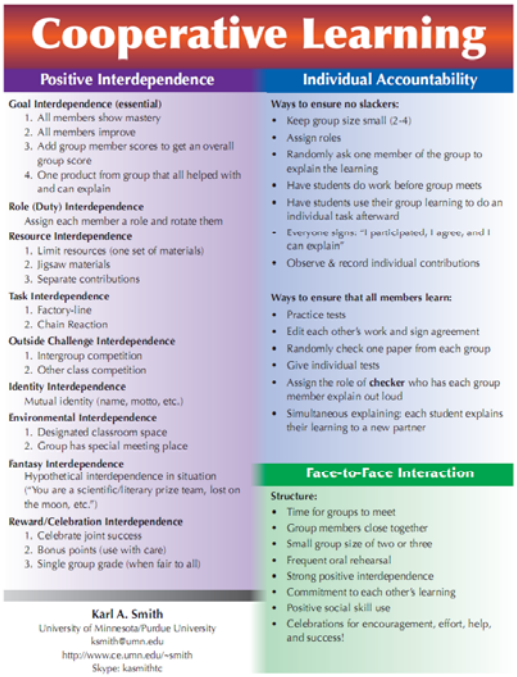

Cooperative Learning

Positive Interdependence

Goal Interdependence (essential)
1. All members show mastery
2. All members improve
3. Add group member scores to get an overall group score
4. One product from group that all helped with and can explain

Role (Duty) Interdependence
Assign each member a role and rotate them

Resource Interdependence
1. Limit resources (one set of materials)
2. Jigsaw materials
3. Separate contributions

Task Interdependence
1. Factory-line
2. Chain Reaction

Outside Challenge Interdependence
1. Intergroup competition
2. Other class competition

Identity Interdependence
Mutual identity (name, motto, etc.)

Environmental Interdependence
1. Designated classroom space
2. Group has special meeting place

Fantasy Interdependence
Hypothetical interdependence in situation ("You are a scientific/literary prize team, lost on the moon, etc.")

Reward/Celebration Interdependence
1. Celebrate joint success
2. Bonus points (use with care)
3. Single group grade (when fair to all)

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Individual Accountability

Ways to ensure no slackers:
- Keep group size small (2-4)
- Assign roles
- Randomly ask one member of the group to explain the learning
- Have students do work before group meets
- Have students use their group learning to do an individual task afterward
- Everyone signs: "I participated, I agree, and I can explain"
- Observe & record individual contributions

Ways to ensure that all members learn:
- Practice tests
- Edit each other's work and sign agreement
- Randomly check one paper from each group
- Give individual tests
- Assign the role of **checker** who has each group member explain out loud
- Simultaneous explaining: each student explains their learning to a new partner

Face-to-Face Interaction

Structure:
- Time for groups to meet
- Group members close together
- Small group size of two or three
- Frequent oral rehearsal
- Strong positive interdependence
- Commitment to each other's learning
- Positive social skill use
- Celebrations for encouragement, effort, help, and success!

http://www.ce.umn.edu/~smith/docs/Smith-CL%20Handout%2008.pdf

Teamwork Skills

- Communication
  - Listening and Persuading
- Decision Making
- Conflict Management
- Leadership
- Trust and Loyalty

Group Processing
Plus/Delta Format

Plus (+) Things That Group Did Well	Delta (Δ) Things Group Could Improve

Team Charter

- Team name, membership, and roles
- Team Mission Statement
- Anticipated results (goals)
- Specific tactical objectives
- **Ground rules/Guiding principles for team participation**
- Shared expectations/aspirations

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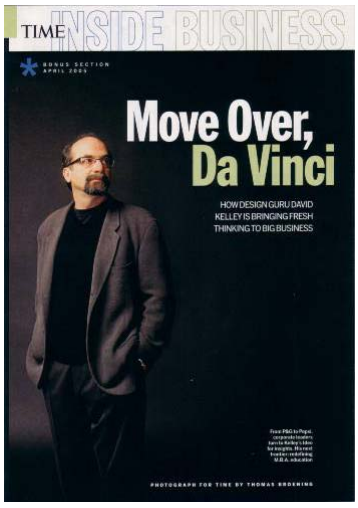
Code of Cooperation

•EVERY member is responsible for the team's progress and success.
•Attend all team meetings and be on time.
•Come prepared.
•Carry out assignments on schedule.
•Listen to and show respect for the contributions of other members; be an active listener.
•CONSTRUCTIVELY criticize ideas, not persons.
•Resolve conflicts constructively,
•Pay attention, avoid disruptive behavior.
•Avoid disruptive side conversations.
•Only one person speaks at a time.
•Everyone participates, no one dominates.
•Be succinct, avoid long anecdotes and examples.
•No rank in the room.
•Respect those not present.
•Ask questions when you do not understand.
•Attend to your personal comfort needs at any time but minimize team disruption.
•HAVE FUN!!
•?

Adapted from Boeing Aircraft Group Team Member Training Manual



Time, April 2005

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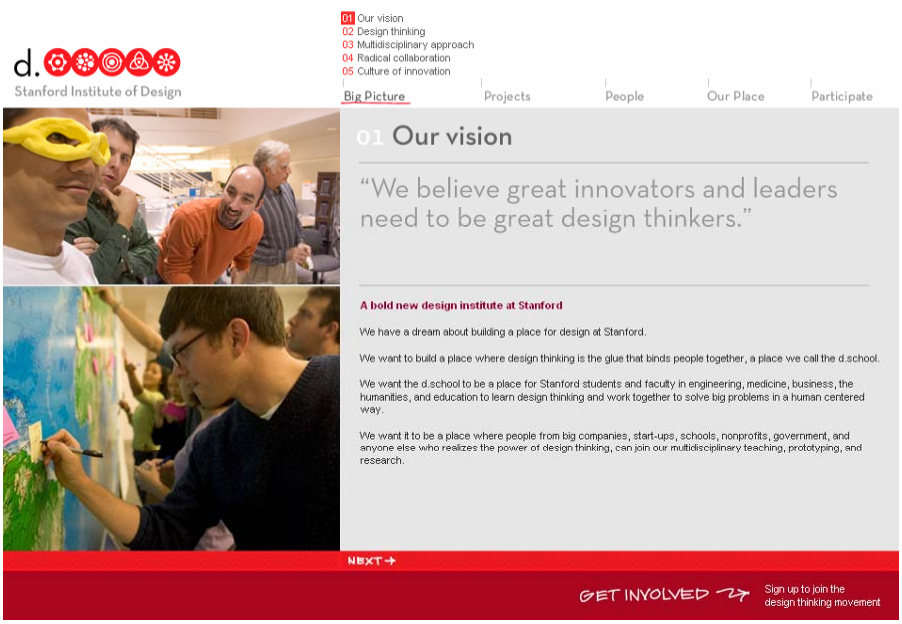


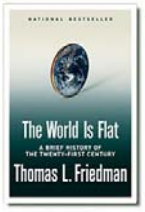
http://www.stanford.edu/group/dschool/big_picture/our_vision.html

Ideo's five-point model for strategizing by design:

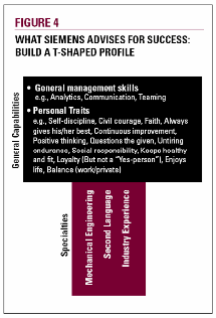
Hit the Streets
Recruit T-Shaped People
Build to Think
The Prototype Tells a Story
Design Is Never Done

Design Thinking

Discipline Thinking



Tom Friedman
Horizontalize Ourselves



AAC&U *College Learning For the New Global Century*

The Innovation Journey

VandeVen, Polley, Garud & Venkataraman, 1999.

The innovation journey is a nonlinear cycle of divergent and convergent activities that may repeat over time and at different organizational levels if resources are obtained to renew the cycle, p. 16.

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IDEO – Deep Dive Video

ABC News
Nightline - 7/13/99

Available From
ABC News Store
www.abcnews.com

Kelley, Tom and Littman, Jonathan (2001) *The art of innovation: Lessons in creativity from IDEO, America's leading design firm*. New York: Random House

Kelley, Tom and Littman, Jonathan (2005) *The ten faces of innovation: IDEO's strategies …* New York: Currency/Doubleday

IDEO – "The Deep Dive"

- IDEO has been identified as America's Leading Design Firm.
- IDEO's special ingredients:
  - Teams
  - Culture
  - Methodology

IDEO – "The Deep Dive"

- Viewing Perspectives:
  - Teams
  - Culture
  - Methodology
  - Videographer

"THE DEEP DIVE"
Five Days at

Components of IDEO process

- Creation of "Hot Teams"
- Brainstorming
- Rapid Prototyping
- Observing & Listening from Customers
- Thinking of products in terms of *verbs*, rather than *nouns*

IDEO's Teams

- Named "Hot Teams."
- Multidisciplinary.
- Group leader is assigned based on their abilities to work with groups.

Seven Secrets for Better Brainstorming

1. Sharpen the focus
2. Playful rules
3. Number your ideas
4. Build and jump
5. The space remembers
6. Stretch your mental muscles
7. Get physical

Playful Rules

- One conversation at a time
- Stay focused on the task
- Encourage wild ideas
- Go for quantity
- Be visual
- Defer judgment
- Build on the ideas of others

IDEO's Culture

- Employees design their own working areas.
- Employees have interest and skills to work with a wide range of people.
- No hierarchies.

Build Your Greenhouse

- Building Neighborhoods
- Think Project, Think Personal
- Building Blocks
- Inspiration from Adversity
- Prototype Your space
- Create a Team Icon
- Watch Your Body Language
- Simple Team Space
- Hierarchy is the Enemy of Team Space
- Give Your Workers a View
- Tell Stories
- Make Your Junk Sing

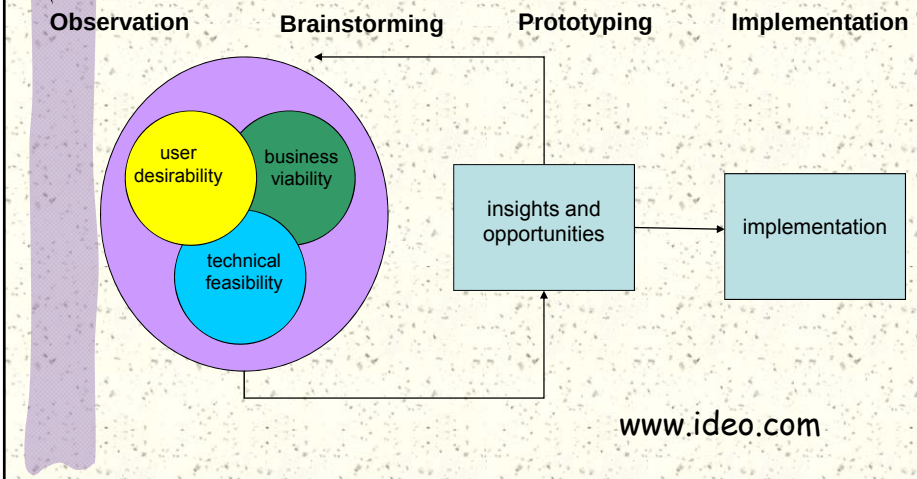
Build Your Greenhouse

- Building Neighborhoods
  - Areas of Congregation
    - Lounge / Common Area
  - Mainstreet
    - Forced Interaction
  - Need for Privacy
    - Quiet Areas
    - Individuality

Five steps to IDEO's innovation

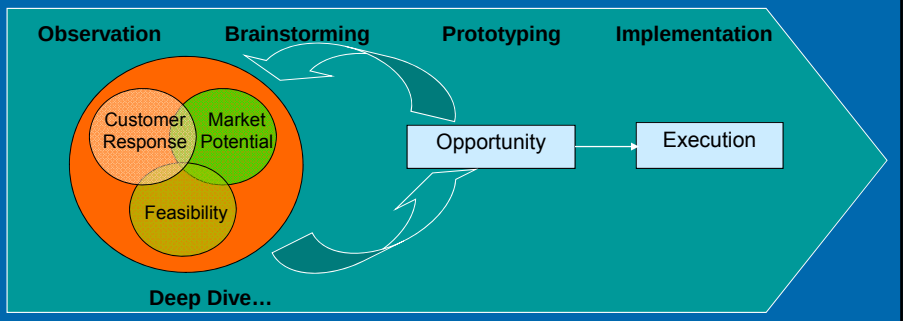
- Understand the market/client/technology/ constraints
- Observe real people in real situations
- Visualize new-to-the-world concepts & ultimate customers
- Evaluate & refine prototypes
- Implement new concept for commercialization

IDEO's Method



www.ideo.com

Ideo Brainstorming



- One Conversation at a time
- Quantity is key
- Use Visual Aids early
- Aggregation of Ideas

1. Duration: Limit Time to an Hour
2. Don'ts: No Presentations, Nor a time to poll employees, and not about swanky retreats.
3. Idea Engine: Blue Sky approach.

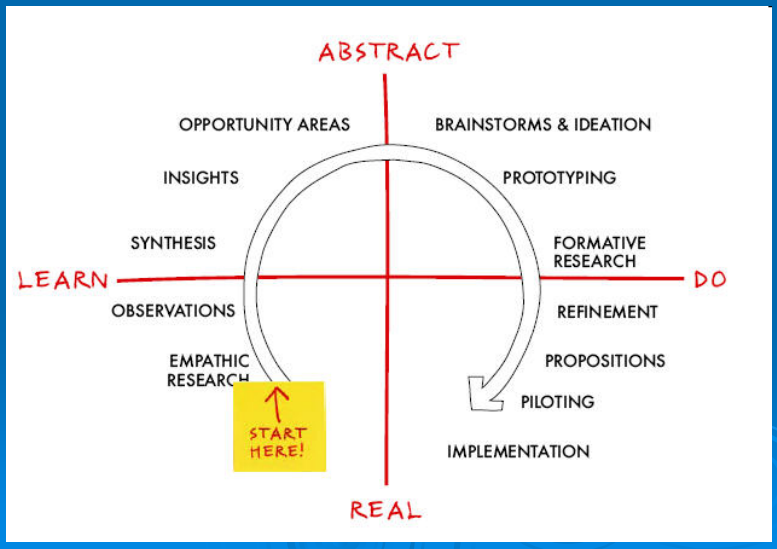
* www.ideo.comhttp://www.1000ventures.com/business_guide/cs_product-design_ideo.html

How to Kill Brainstorming

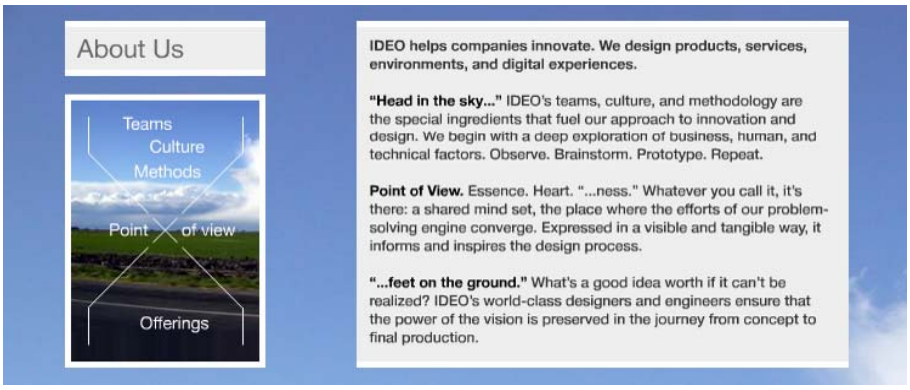
- The boss speaks first.
- Everybody gets a turn
- Experts Only – diversity trumps expertise
  - Kelley's Rule: 1 person who can build things, 1 with customer experience, and a sci-fi nerd.
- Off Site
- No Silly Stuff
- Document Everything

http://www.qualityoflife.org/ich/IDEO/IDEO.cfm

IDEO's Innovation Methodology



Source: http://www.mediawerk.ch/nerve/category/visual-literacy/



www.ideo.com

Innovation Resources

Additional Perspectives on Innovation:

- **DEC** - Schein, Edgar H., et.al. 2003. *DEC is dead: Long live DEC – The lasting legacy of Digital Equipment Corporation*. San Francisco: Berrett-Koehler.
- **The Innovation Journey** – Van de Ven, Andrew H., Polley, Douglas E., Garud, Raghu & Venkataraman, Sankaran. 1999. *The Innovation Journey.* New York: Oxford University Press.
- **Organizational Change and Innovation Processes** – Poole, Marshall S., Van de Ven, Andrew H., Dooley, Kevin, and Holmes, Michael E. 2000. *Organizational Change and Innovation Processes: Theory and Methods for Research.* New York: Oxford University Press.
- **Weird Ideas that Work** – Sutton, Robert I. 2002. *Weird Ideas that Work: 11-1/2 Practices for Promoting, Managing, and Sustaining Innovation*. New York: Free Press.

Innovation Resources

- Amabile, Teresa M. and Khaire, Mukti. 2008. Creativity and the role of the leader. *Harvard Business Review*, 86(10), 100-109.
- Prahalad, C.K. and Krishan, M.S. 2008. The New Age of Innovation. New York: McGraw-Hill. First chapter http://www.newageofinnovation.com/
- Berkun, Scott. 2007. *The myths of innovation*. Sebastropol, CA: O'Reilly.
- Chesbrough, Henry. 2006. *Open innovation: The new imperative for creating and profiting from technology*. Cambridge, MA: Harvard Business School Press
- Hargadon, Andrew. 2003. *How Breakthroughs Happen: The surprising truth about how companies innovate.* Cambridge, MA: Harvard Business School Press.

Team Decision Making Exercise

- Team Decision Making
  - Ranking Task
- Team-Based Learning Assessment Formats
  - Individual Reflection and Review
  - Process Observation
  - Group Processing – Plus/Delta

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Teamwork Skills

- Communication
  - Listening and Persuading
- **Decision Making**
- Conflict Management
- Leadership
- Trust and Loyalty

Formal Decision-Making Approaches

Objective	Deterministic	Stochastic
Multiple	**Ranking** AHP SMART	MAUT
Single	B/C LP Optimization	Decision Tree (EV) Simulation

Team Decision Making – Ranking Tasks

- Typically "survival" tasks
  - First was Moon Survival, "Lost on the moon" developed by Jay Hall for NASA in 1967
  - Many survival tasks available – desert survival, lost at sea, winter survival, …
- Individual followed by team ranking
- Different decision-making conditions in each team

Team Member Roles

- Observer/ Process Recorder (non participant role)
- Facilitator/Time Keeper
- Task Recorder
- Skeptic/Prober

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Action	Name 1	Name 2	Name 3	Name 4	Total
Contributes Ideas					
Describes Feelings					
Encourages Participation					
Summarizes, Integrates					
Checks for Understanding					
Relates New To Old Learning					
Gives Direction To Work					
Total					

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Team Decision Making…
The New They'll Never Take Us Alive!!

The top fifteen causes of death in the United States in 2003 in alphabetical order. The data are based on an annual review of death certificates. Your task is to rank them in decreasing order of number of deaths caused each year. Place the number 1 next to the one that causes the most deaths, the number 2 by the next, and so forth.

To Group Members: TASKS

1. Individually determine the ranking.
2. Determine one ranking for the group.
3. Every group member must be able to explain the rationale for the group's ranking.
4. When your group finishes (each member has signed), (a) record your estimated number of fatalities in the U.S. for each, and then (b) compare your ranking with that of another group.

The New They'll Never Take Us Alive!!

Product or Activity	Ranking	Number of Fatalities
Accidents		
Alzheimer's disease		
Blood poisoning		
Cancer		
Diabetes		
Heart disease		
Hypertension		
Influenza and Pneumonia		
Kidney disease		
Liver disease		
Lung disease		
Parkinson' disease		
Pneumonitis		
Stroke		
Suicide		

Product or Activity	Ranking	Number of Fatalities
Accidents	5	105695
Alzheimer's disease	8	63343
Blood poisoning	10	34243
Cancer	2	554643
Diabetes	6	73965
Heart disease	1	684462
Hypertension	13	21841
Influenza and pneumonia	7	64847
Kidney disease	9	42536
Liver disease	12	27201
Lung disease	4	126128
Parkinson' disease	14	17898
Pneumonitis	15	17457
Stroke	3	157803
Suicide	11	30642

US Mortality Causes - 2003

1	Heart disease	684462
2	Cancer	554643
3	Stroke	157803
4	Lung disease	126128
5	Accidents	105695
6	Diabetes	73965
7	Influenza and pneumonia	64847
8	Alzheimer's disease	63343
9	Kidney disease (Nephritis/nephrosis)	42536
10	Blood poisoning	34243
11	Suicide	30642
12	Liver disease	27201
13	Hypertension	21841
14	Parkinson' disease	17898
15	Pneumonitis	17457

Postdecision Questionaire

1. How understood and listened to did you feel in your group?
   Not at all 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 Completely
2. How much influence do you feel you had in your group's decision making?
   None 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 A great deal
3. How committed do you feel to the decision your group made?
   None 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 A great deal
4. How much responsibility do you feel for making the decision work?
   None 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 A great deal
5. How satisfied do you feel with the amount and quality of your participation in your group's decision making
   Dissatisfied 1 – 2 – 3 – 4 – 5 – 6 – 7 – 8 – 9 Satisfied
6. Write one adjective that describes the atmosphere in your group during the decision making

Group Processing
Plus/Delta Format

Plus (+) Things That Group Did Well	Delta (Δ) Things Group Could Improve

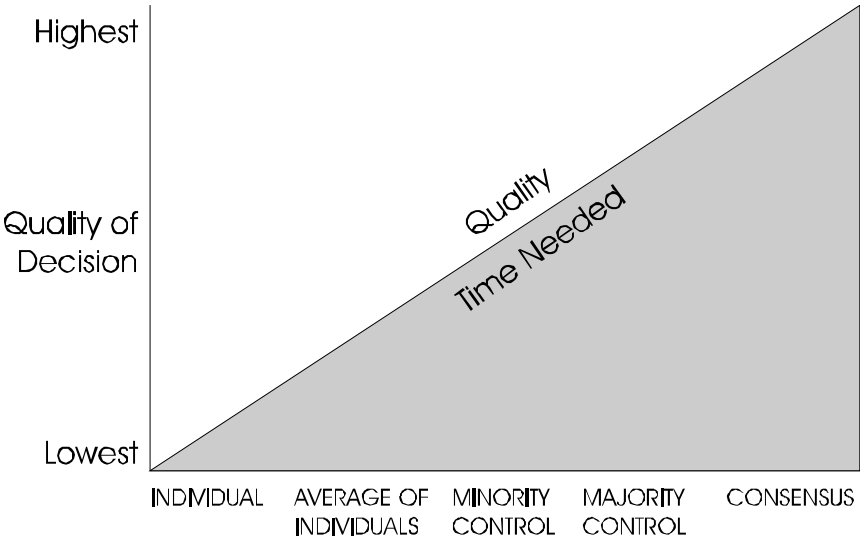
Team Decision-Making Process

- How
  - Individual
  - Mathematical
  - Consensus
  - Iterative – H, M, L
  - Both ends toward the middle
- Assumptions/Biases
  - Family/Friends
  - News
  - Youth
  - Geographic location

Methods of Decision Making (Johnson & Johnson, 1991)

1. Decision by authority without discussion
2. Expert member
3. Average of member's opinions
4. Decision by authority after discussion
5. Majority control
6. Minority control
7. Consensus

See Table Summarizing Characteristics – Smith (2007), p. 46



Johnson, D.W. & Johnson, F.P. 1991. *Joining together: Group theory and group skills.* Prentice-Hall