Facilitating Innovation and Creativity in a Team Environment

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Workshop Layout

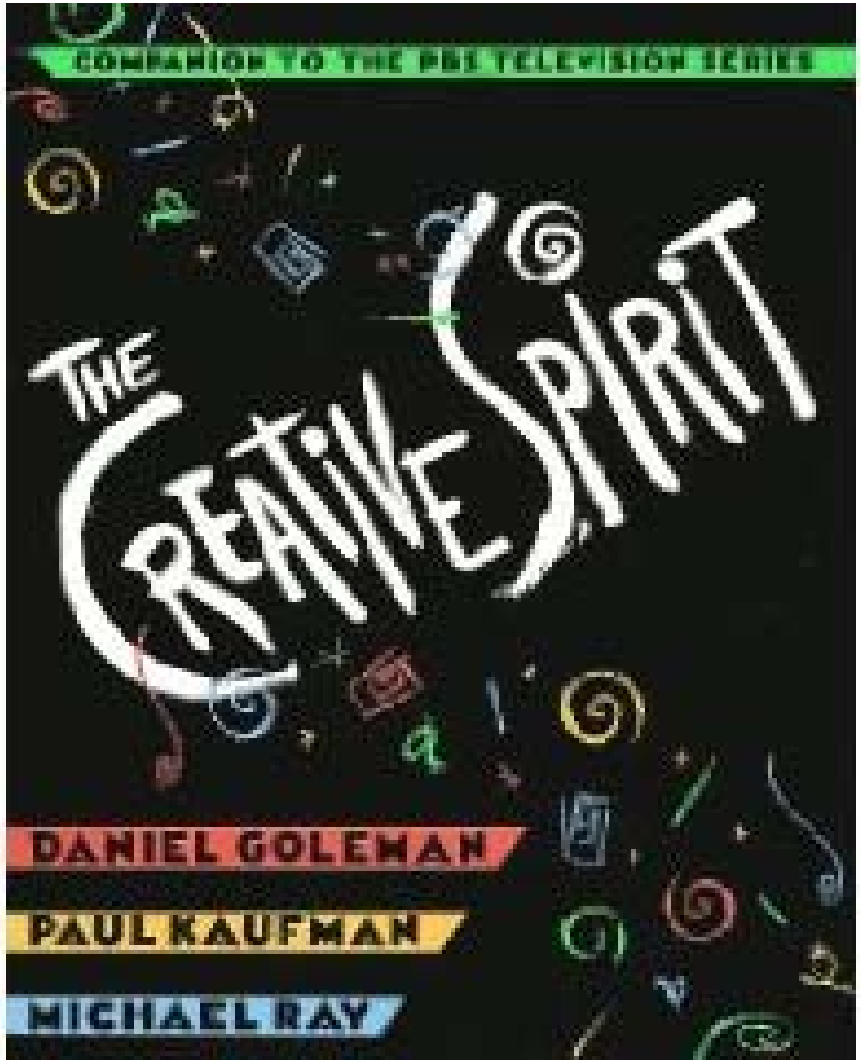
- Welcome & Overview
- Innovation and Creativity
  - What are the key features?
  - How do we cultivate?
- Innovation and Creativity in a Team Environment
  - High performance teamwork
  - IDEO example
- Wrap-up and Next Steps

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

Innovation and Creativity

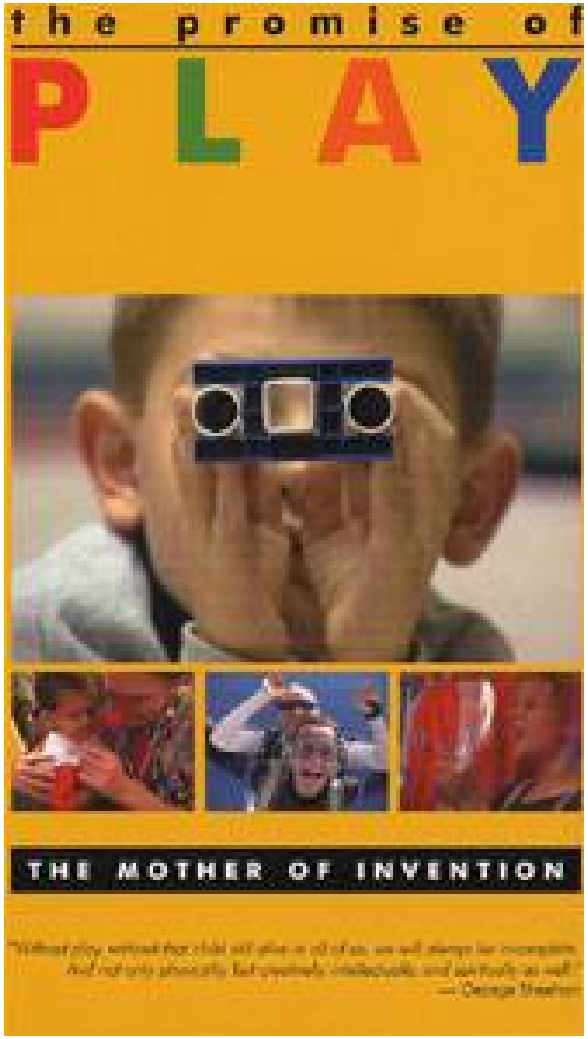
- Individually reflect on
  - Key features and how to cultivate innovation and creativity in a team environment
  - Record your ideas
- Turn to the person next to you
  - Exchange ideas
  - Develop a list to share with whole group
- Whole Group discussion



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

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

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

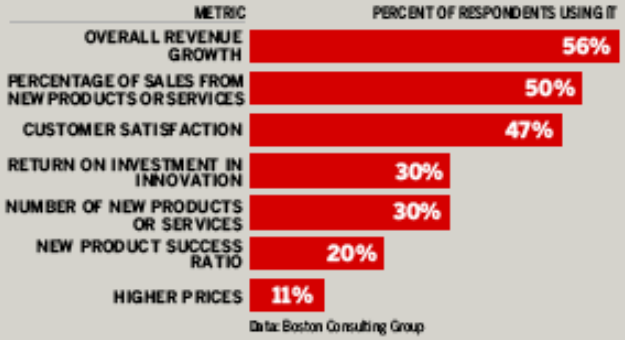
Old-timers at 3M are expected to **hand down tales of the company's long innovation tradition** to new engineers. Before long, every new 3Mer can quote the philosophies of former CEO William McKnight.

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.**

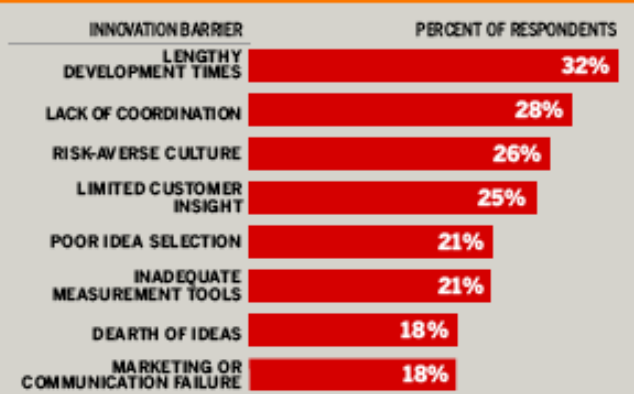
Clear Facts for a Hazy Process

Companies frequently use overly broad methods to measure innovation success



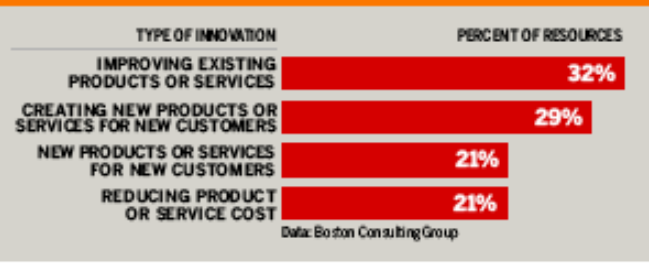
The Enemies of Innovation

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



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

Data: Boston Consulting Group, Standard & Poor's Compustat *FISCAL YEAR EARNINGS BEFORE INTEREST AND TAXES AS PERCENT OF REVENUES

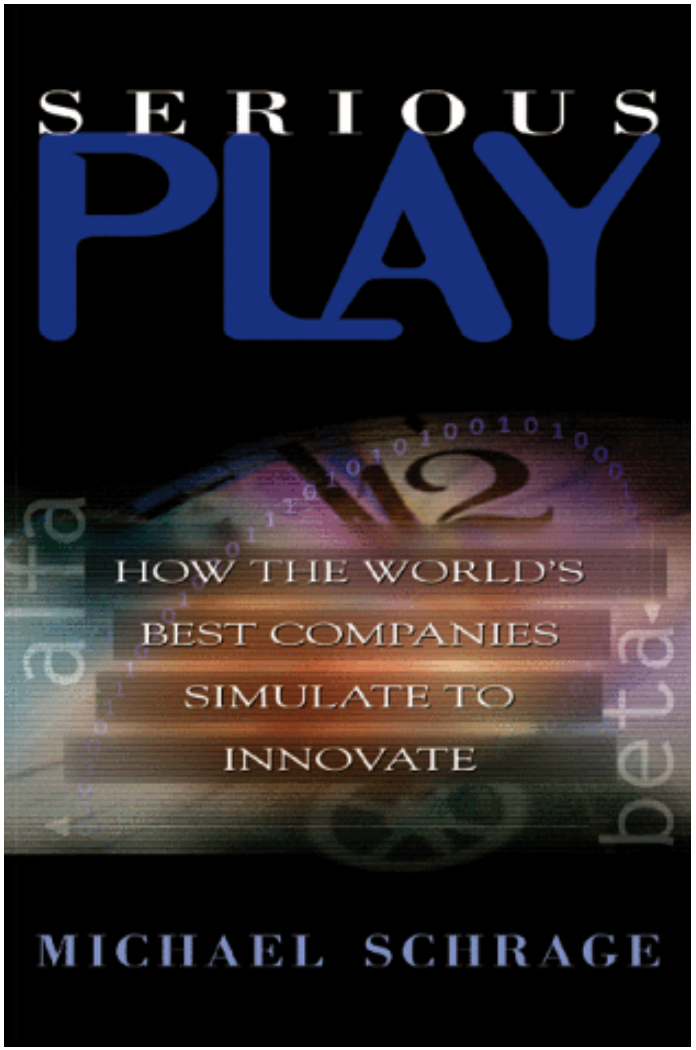
http://www.businessweek.com/magazine/content/06_17/b3981401.htm

Jeong Kim – Director Bell Labs

- "There are people in the hedge-fund and financial sectors who have made so much money," he says. "But what have they created? What value?" **The goal of the innovator, as he sees it, is to have a positive impact on your company, your country, and yourself**.
- By his estimation, Bell Labs' value is in its critical mass – a lot of researchers in close proximity, sharing insights and expertise. But he also points to two earlier Bell Labs inventions: "Remember, the transistor was invented by three people, not 30,000. The laser was invented by two."

Jon Gertner, *Fast Company,* February, 2008
http://www.fastcompany.com/magazine/122/mad-scientist.html

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*

VisiCalc Information: History and commentary from the guys who created it

Dan Bricklin's Web Site: www.bricklin.com

Home

VisiCalc: Information from its creators, Dan Bricklin and Bob Frankston

If you're looking for material about VisiCalc, this is the place!

This web site, **www.bricklin.com**, includes lots of information about VisiCalc, the first computer spreadsheet program as we know them today. It has material directly from Dan Bricklin and Bob Frankston, the co-creators of VisiCalc, including scans of original photographs from VisiCalc's development days, a working copy of the program, and other things from Software Arts, Inc., Dan and Bob's company. Additional material is constantly being added, so researchers, computer historians, and teachers should check back periodically.

VisiCalc material on this web site includes:

- **The History section**: Photos and narrative about the development of VisiCalc and other products from Dan Bricklin. Includes pictures of the attic where much of VisiCalc was written in 1979, early ads and reviews, pictures of the packaging and screenshots, and more.
- **A copy of VisiCalc you can run**: Lotus has given permission to post a working copy of the original IBM PC VisiCalc spreadsheet program from 1981 on this web site. You can download it and run it on a PC under MSDOS under Windows.
- **Patenting VisiCalc**: An essay about why VisiCalc was not patented.
- **Adam Osborne Recording**: A recording of Adam Osborne giving Dan

Done

Serious Play - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Back Forward Reload Stop Home http://danbricklin.com/log/seriousplay.htm

Getting Started Latest Headlines

Serious Play | The Risk of Innovation: Will Anyone E... | MOT-613: Brief Re

danbricklin.com/log

Home

Serious Play

I recommend Michael Schrage's book, *Serious Play: How the World's Best Companies Simulate to Innovate*, to people who are interested in the process of innovation and how to improve that process in their company. He examines many aspects of prototyping and describes how they fit into the innovation process. The increasing availability of inexpensive, quick-to-create computer-based prototypes makes understanding this process important.

Disclaimer: *Like with many commentators of the high-tech scene, I've known Michael for over 15 years, from when he first interviewed me about spreadsheets. He used material from some of his discussions with me in the book, and treats me and my work very kindly in it. Nevertheless, I think it's really important even if I wasn't mentioned at all in the book.*

The topic of this book is very dear to me. Ever since my father first taught me as a child to prototype things before I built them, simulation has been a major part of my career. I still remember him explaining the virtues of making a prototype. He was a printer who learned to mock up brochures and newsletters before he printed them to make sure his customers knew what they'd get. I applied the technique when creating the spreadsheet, itself a prototyping tool, going through several prototypes before Bob and I built the real thing, learning a lot from each. The need for more types of people in software development to be able to prototype user interfaces brought about *Dan Bricklin's Demo Program*, a product I wrote in the mid 1980's that was successful because rapid prototyping is so important. To this day I'm getting emails from people telling me how a prototype made with *Demo* helped them fund a product or create an interface.

Tom Peters wrote the Forward to Michael's book. In it he says: "In short, I love this book!...Schrage's shtick, *rapid prototyping*, sounds like a third-order innovation tool. Not so, Schrage argues persuasively. Rapid

Done

"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

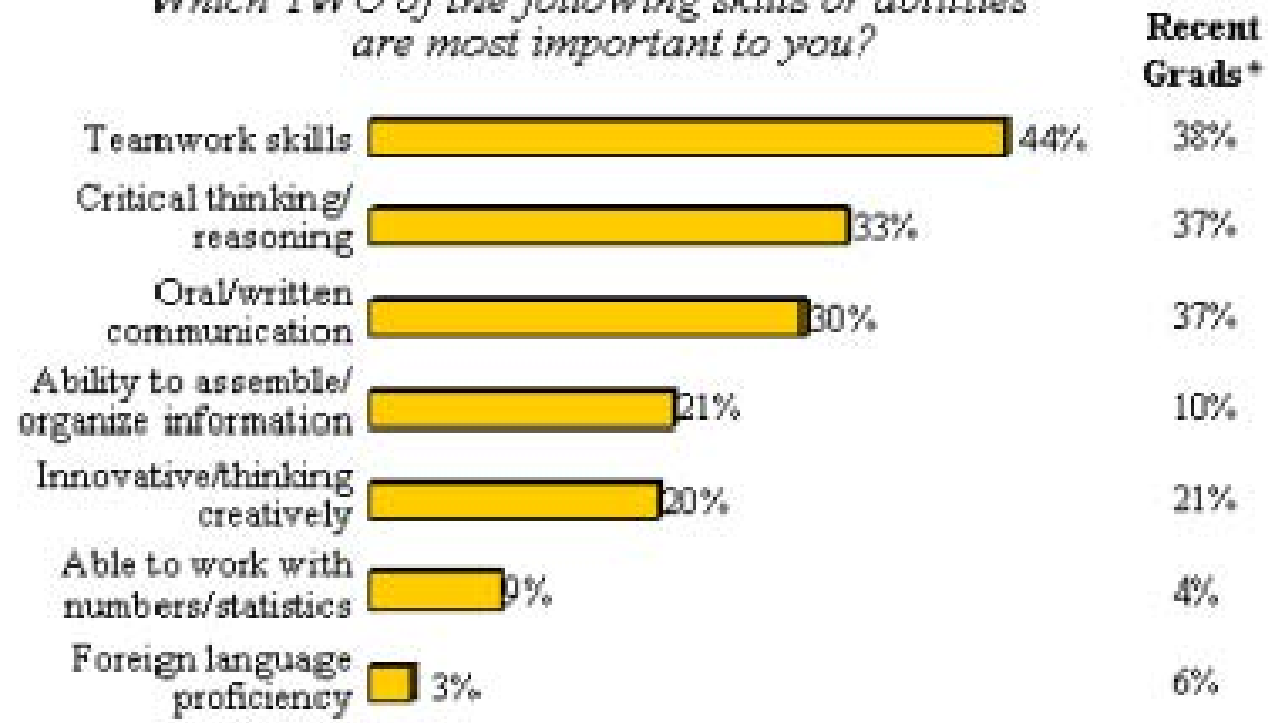
By Peter D. Hart Research Associates, Inc.

December 28, 2006

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

Most Important Skills Employers Look For In New Hires

Which TWO of the following skills or abilities are most important to you?



* Skills/abilities recent graduates think are the two most important to employers

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

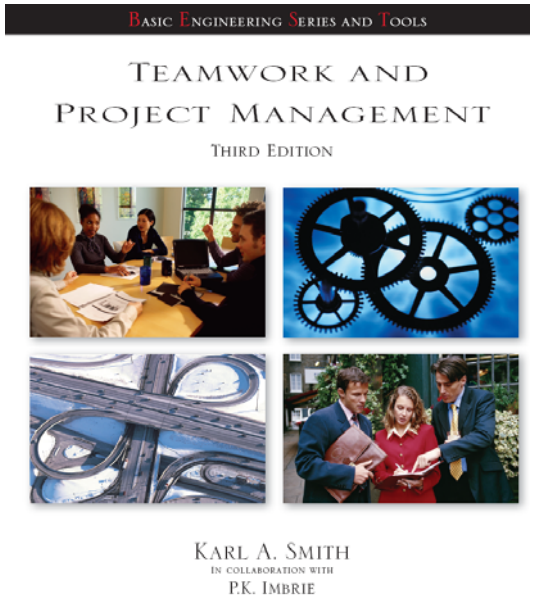
Top Three Main Engineering Work Activities

Engineering Total

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

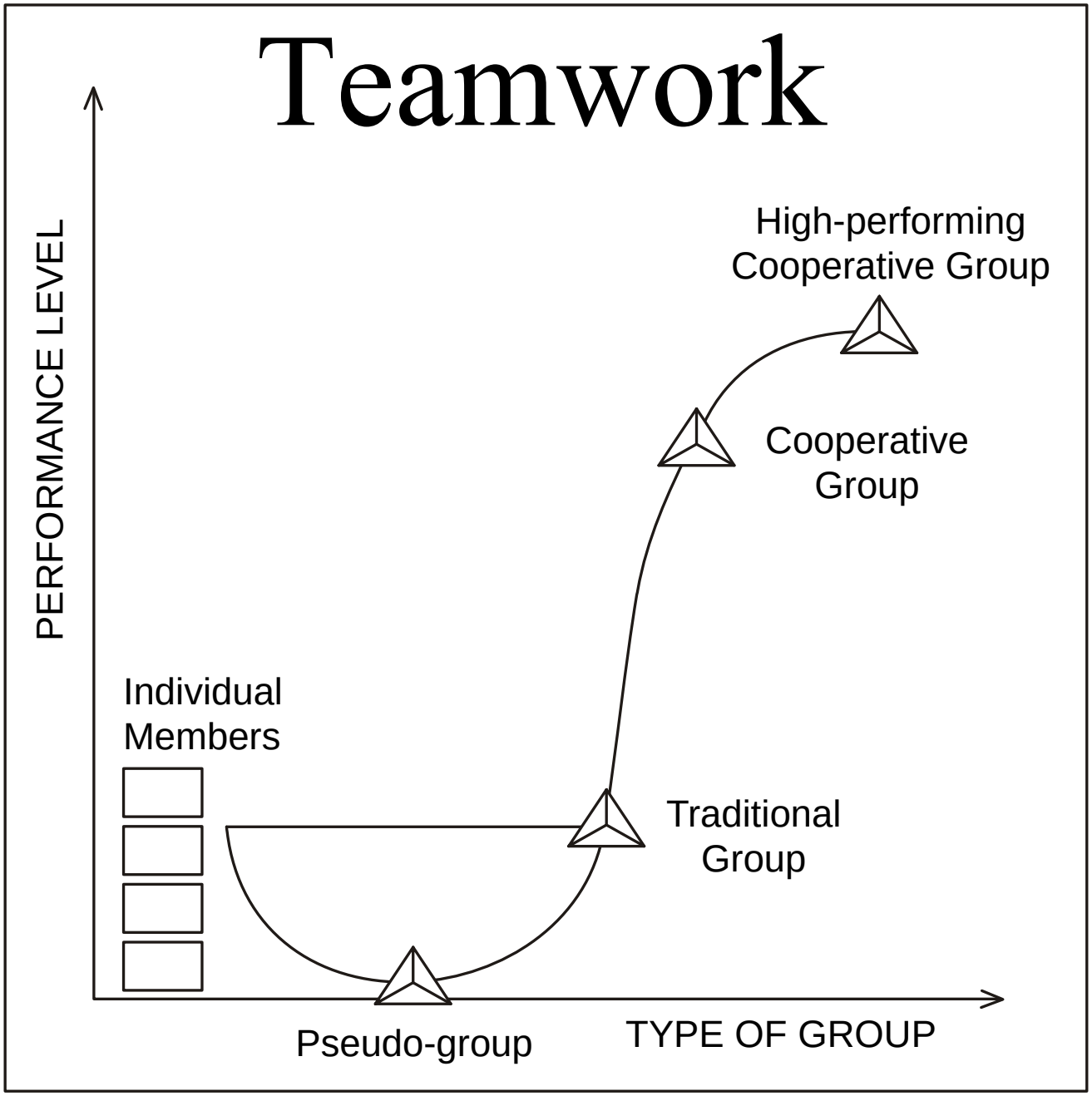
Civil/Architectural

- 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.

Teamwork


PERFORMANCE LEVEL
High-performing
Cooperative Group
Cooperative
Group
Individual
Members
Traditional
Group
Pseudo-group
TYPE OF GROUP

Characteristics of Effective Teams

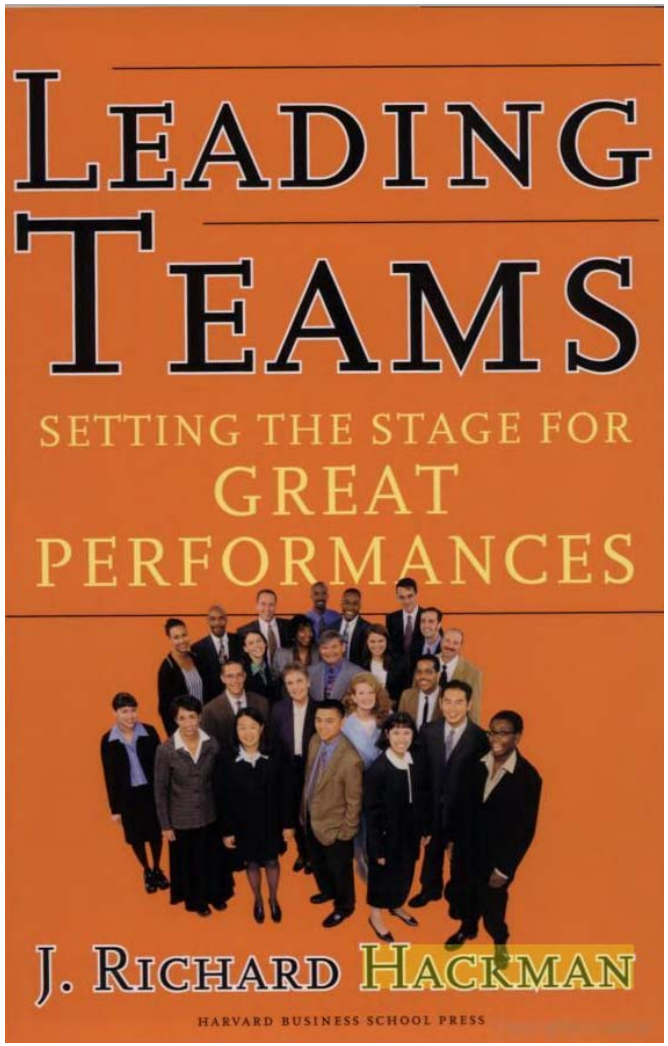
- ?

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

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

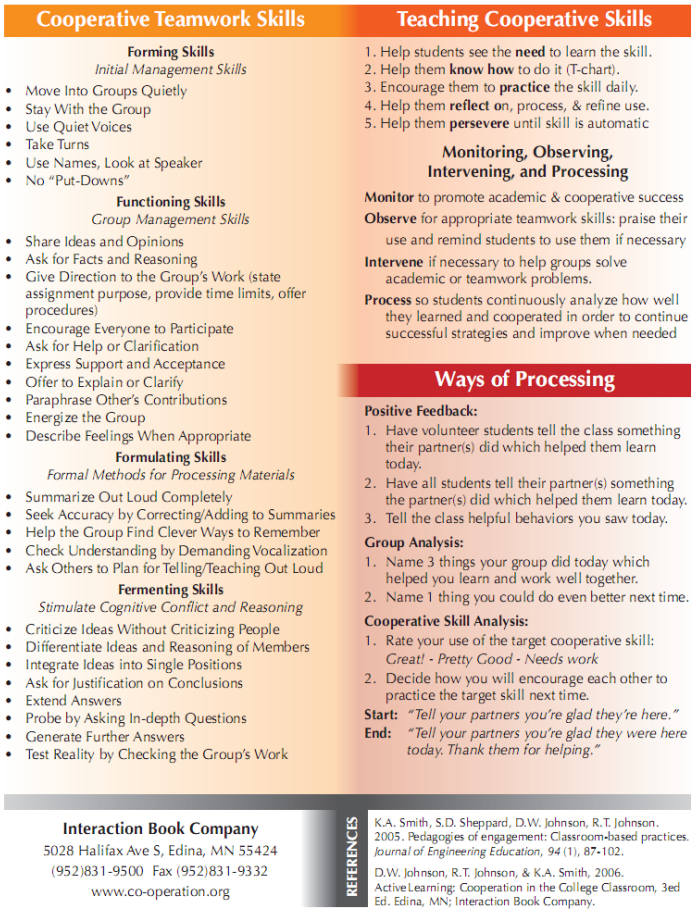
Structure:

- 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



Cooperative Teamwork Skills

Forming Skills
Initial Management Skills

- Move Into Groups Quietly
- Stay With the Group
- Use Quiet Voices
- Take Turns
- Use Names, Look at Speaker
- No "Put-Downs"

Functioning Skills
Group Management Skills

- Share Ideas and Opinions
- Ask for Facts and Reasoning
- Give Direction to the Group's Work (state assignment purpose, provide time limits, offer procedures)
- Encourage Everyone to Participate
- Ask for Help or Clarification
- Express Support and Acceptance
- Offer to Explain or Clarify
- Paraphrase Other's Contributions
- Energize the Group
- Describe Feelings When Appropriate

Formulating Skills
Formal Methods for Processing Materials

- Summarize Out Loud Completely
- Seek Accuracy by Correcting/Adding to Summaries
- Help the Group Find Clever Ways to Remember
- Check Understanding by Demanding Vocalization
- Ask Others to Plan for Telling/Teaching Out Loud

Fermenting Skills
Stimulate Cognitive Conflict and Reasoning

- Criticize Ideas Without Criticizing People
- Differentiate Ideas and Reasoning of Members
- Integrate Ideas into Single Positions
- Ask for Justification on Conclusions
- Extend Answers
- Probe by Asking In-depth Questions
- Generate Further Answers
- Test Reality by Checking the Group's Work

Teaching Cooperative Skills

1. Help students see the **need** to learn the skill.
2. Help them **know how** to do it (T-chart).
3. Encourage them to **practice** the skill daily.
4. Help them **reflect o**n, process, & refine use.
5. Help them **persevere** until skill is automatic

Monitoring, Observing, Intervening, and Processing

Monitor to promote academic & cooperative success

Observe for appropriate teamwork skills: praise their use and remind students to use them if necessary

Intervene if necessary to help groups solve academic or teamwork problems.

Process so students continuously analyze how well they learned and cooperated in order to continue successful strategies and improve when needed

Ways of Processing

Positive Feedback:

1. Have volunteer students tell the class something their partner(s) did which helped them learn today.
2. Have all students tell their partner(s) something the partner(s) did which helped them learn today.
3. Tell the class helpful behaviors you saw today.

Group Analysis:

1. Name 3 things your group did today which helped you learn and work well together.
2. Name 1 thing you could do even better next time.

Cooperative Skill Analysis:

1. Rate your use of the target cooperative skill: *Great! - Pretty Good - Needs work*
2. Decide how you will encourage each other to practice the target skill next time.

Start: *"Tell your partners you're glad they're here."*
End: *"Tell your partners you're glad they were here today. Thank them for helping."*

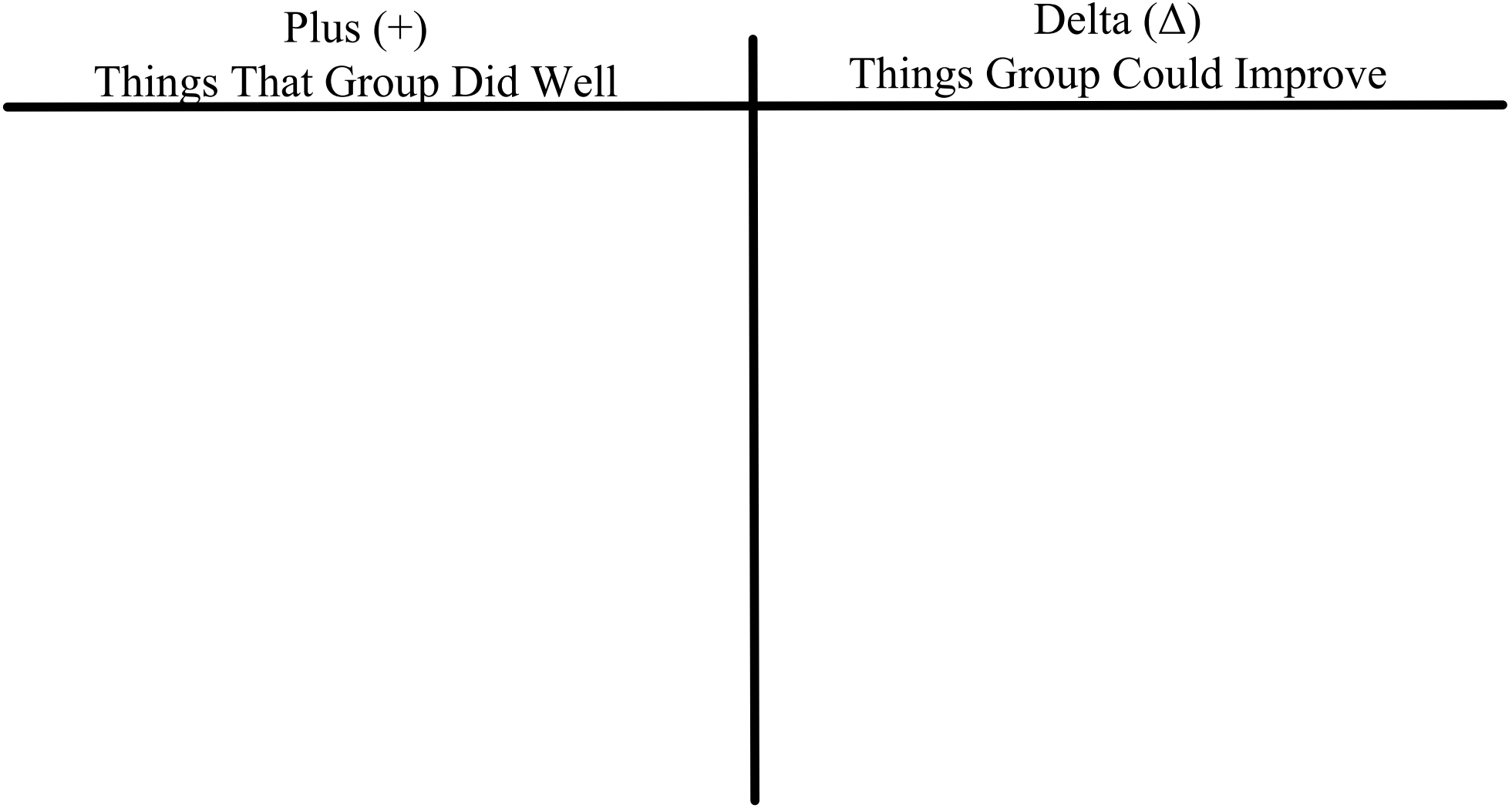
Interaction Book Company
5028 Halifax Ave S, Edina, MN 55424
(952)831-9500 Fax (952)831-9332
www.co-operation.org

REFERENCES

K.A. Smith, S.D. Sheppard, D.W. Johnson, R.T. Johnson. 2005. Pedagogies of engagement: Classroom-based practices. *Journal of Engineering Education, 94* (1), 87-102.

D.W. Johnson, R.T. Johnson, & K.A. Smith, 2006. Active Learning: Cooperation in the College Classroom, 3ed Ed. Edina, MN; Interaction Book Company.

Group Processing
Plus/Delta Format



Team Charter

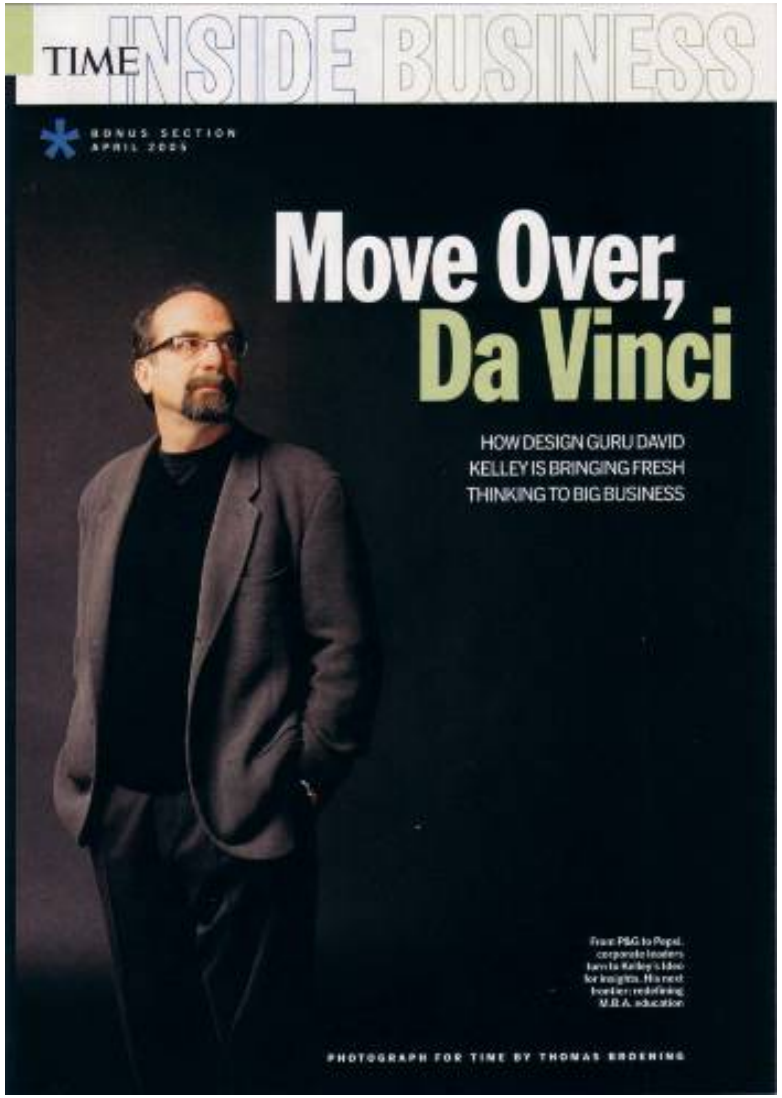
- Team name, membership, and roles
- Team Mission Statement
- Anticipated results (goals)
- Specific tactical objectives
- **Ground rules/Guiding principles for team participation**
- Shared expectations/aspirations

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

http://www.businessweek.com/magazine/content/04_20/b3883001_mz001.htm



Time, April 2005

d.

Stanford Institute of Design

01 Our vision
02 Design thinking
03 Multidisciplinary approach
04 Radical collaboration
05 Culture of innovation

Big Picture | Projects | People | Our Place | Participate

01 Our vision

"We believe great innovators and leaders need to be great design thinkers."

A bold new design institute at Stanford

We have a dream about building a place for design at Stanford.

We want to build a place where design thinking is the glue that binds people together, a place we call the d.school.

We want the d.school to be a place for Stanford students and faculty in engineering, medicine, business, the humanities, and education to learn design thinking and work together to solve big problems in a human centered way.

We want it to be a place where people from big companies, start-ups, schools, nonprofits, government, and anyone else who realizes the power of design thinking, can join our multidisciplinary teaching, prototyping, and research.

NEXT →

GET INVOLVED → Sign up to join the design thinking movement

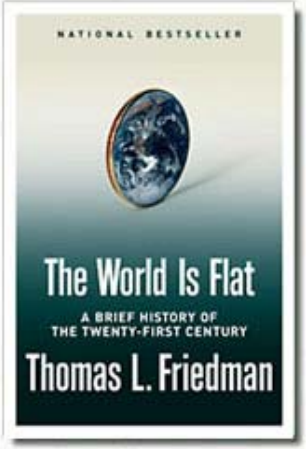
http://www.stanford.edu/group/dschool/big_picture/our_vision.html

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

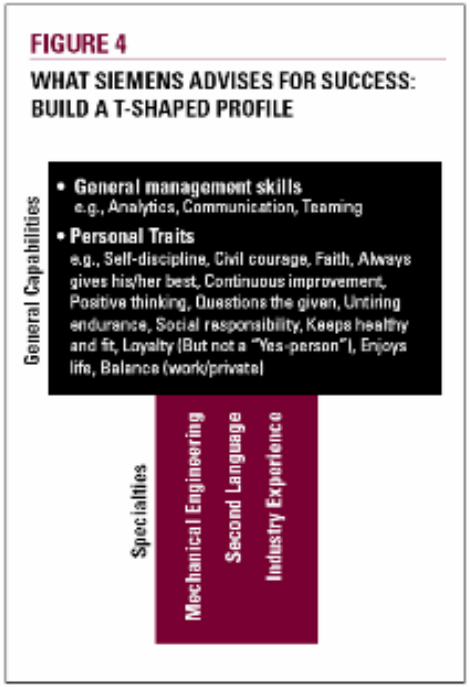
Hit the Streets
Recruit T-Shaped People
Build to Think
The Prototype Tells a Story
Design Is Never Done

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.

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

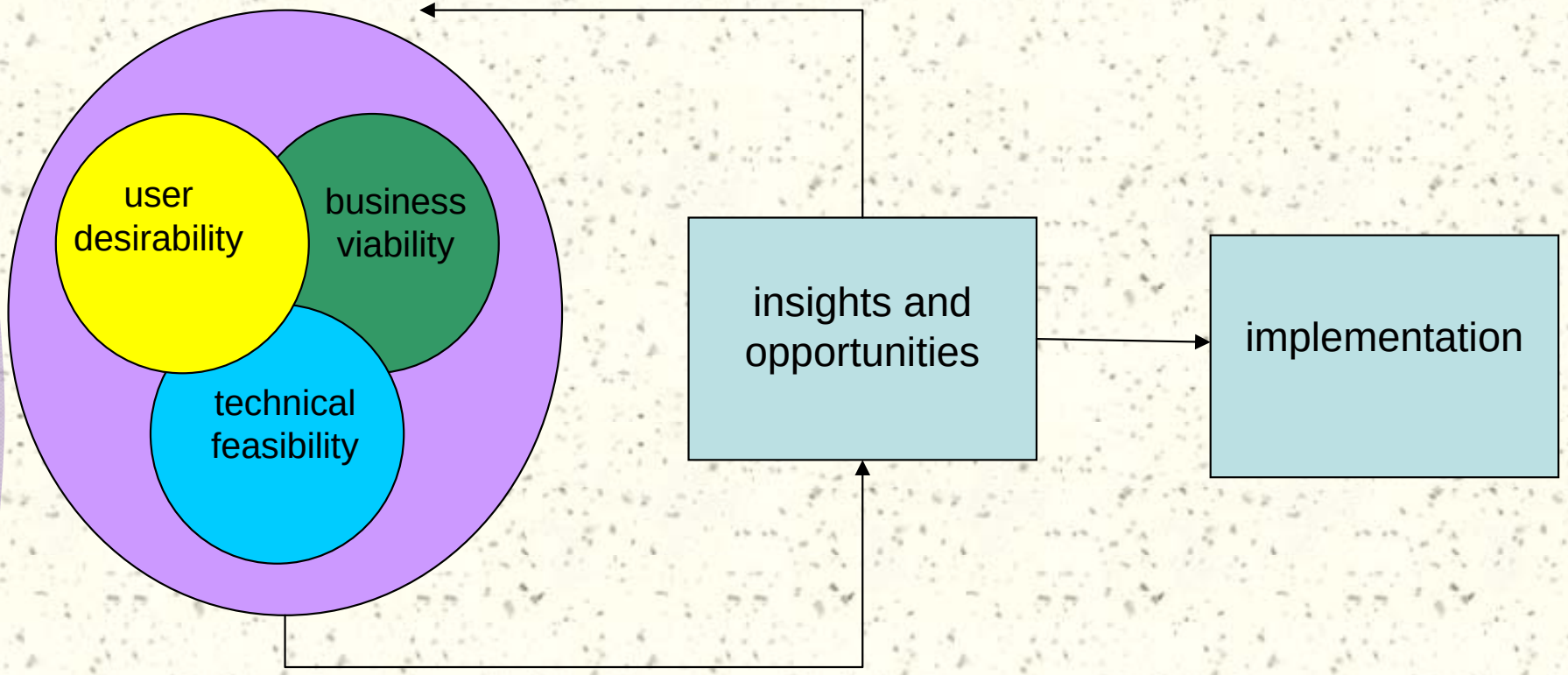
- Building Neighborhoods
  - Areas of Congregation
    - Lounge / Common Area
  - Mainstreet
    - Forced Interaction
  - Need for Privacy
    - Quiet Areas
    - Individuality

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

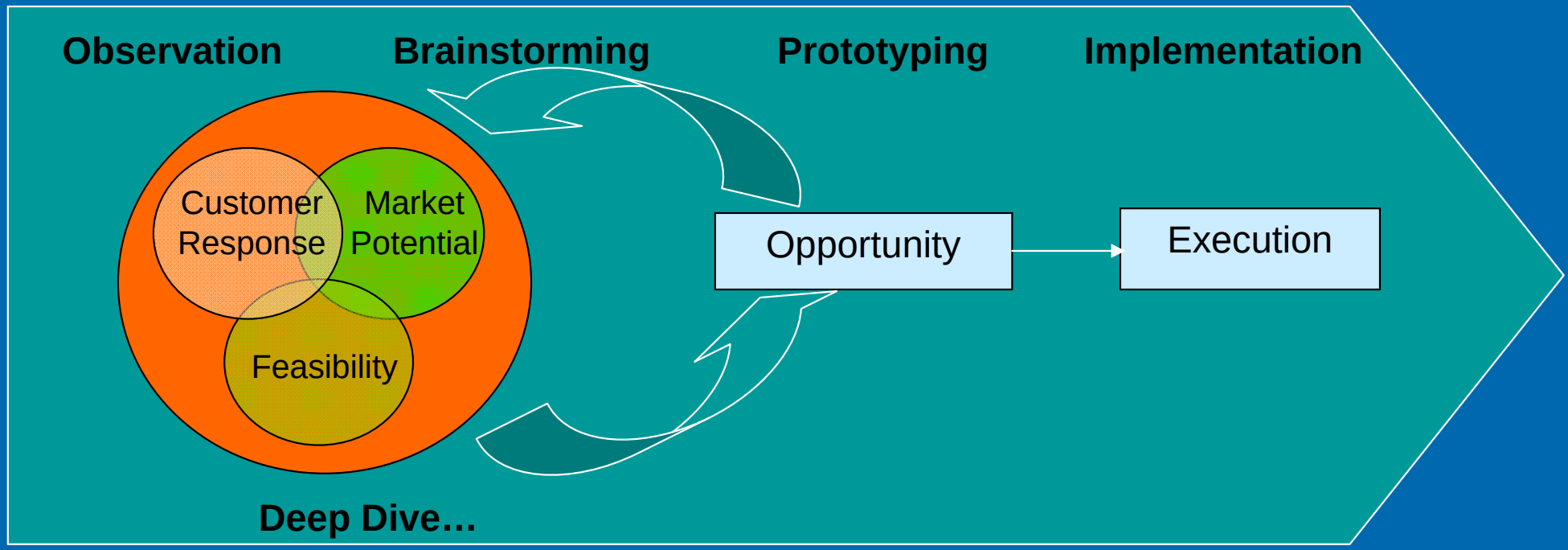
IDEO's Method

Observation **Brainstorming** **Prototyping** **Implementation**



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.

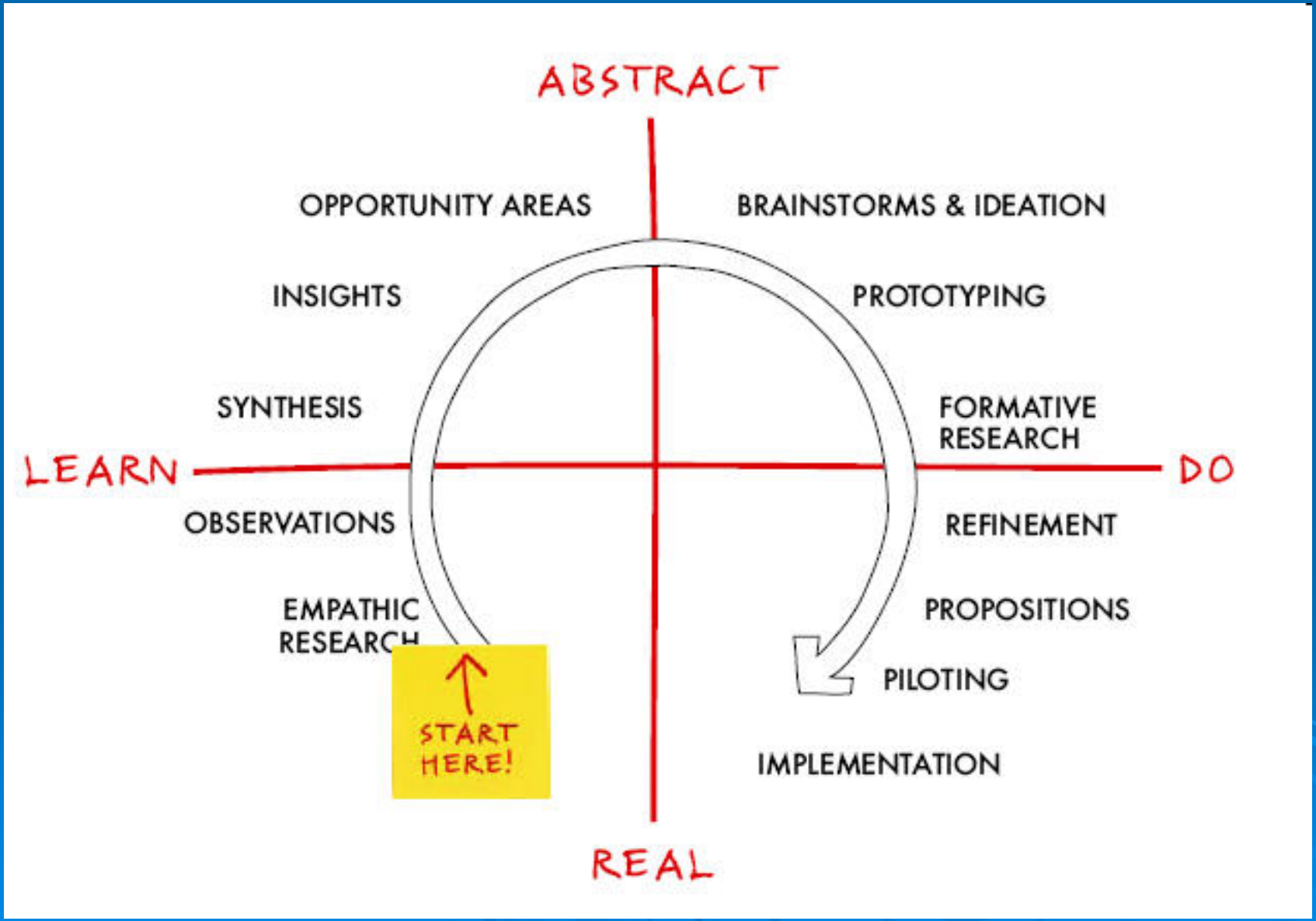
* www.ideo.comhttp://www.1000ventures.com/business_guide/cs_product-design_ideo.html

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

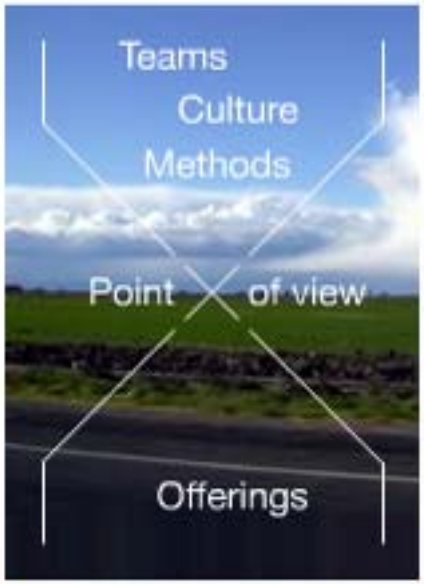
http://www.qualityoflife.org/ich/IDEO/IDEO.cfm

IDEO's Innovation Methodology



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

About Us



IDEO helps companies innovate. We design products, services, environments, and digital experiences.

"Head in the sky..." IDEO's teams, culture, and methodology are the special ingredients that fuel our approach to innovation and design. We begin with a deep exploration of business, human, and technical factors. Observe. Brainstorm. Prototype. Repeat.

Point of View. Essence. Heart. "...ness." Whatever you call it, it's there: a shared mind set, the place where the efforts of our problem-solving engine converge. Expressed in a visible and tangible way, it informs and inspires the design process.

"...feet on the ground." What's a good idea worth if it can't be realized? IDEO's world-class designers and engineers ensure that the power of the vision is preserved in the journey from concept to final production.

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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.