Constructive Controversy in Graduate and Professional Courses

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Constructive Controversy for Innovation (CCI) Expert Panel

ETHZ – Psychology of Work Research Group (PdA)
FHNW – School for Applied Psychology (APS)

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Context: Constructive Controversy in Graduate and Professional Courses

- University of Minnesota – Technological Leadership Institute – Professional MS Programs
  - Management of Technology (MOT)
  - Infrastructure Systems Management & Engineering (ISME)
- Purdue University – School of Engineering Education – PhD Program
  - Foundation Course: History and Philosophy of Engineering and Engineering Education
- Conferences and Universities
  - ASEE/IEEE Frontiers in Education Conference
  - Nanyang Technological University, Singapore

What is Constructive Controversy?

- "Constructive controversy is an instructional procedure that combines cooperative learning (in which students work together in small groups to develop a report on an assigned topic, for example) with structured intellectual conflict (in which students argue the pro and con positions on an issue in order to stimulate problem-solving and reasoned judgment)." (p. 30)

Ref: Johnson, D.W., Johnson, R.T., & Smith, K.A., "Constructive Controversy: The Educative Power of Intellectual Conflict", *Change*, 2000, Vol. 32, No. 1, pp. 28-37.

Constructive Controversy Procedure

Step	Typical Phrase
Prepare	Our Best Case Is...
Present	The Answer Is...Because...
Open Discussion	Your Position is Inadequate Because...
	My Position is Better Because...
Perspective Reversal	Your Position Is...Because...
Synthesis	Our Best Reasoned Judgment Is...

Theory and Evidence

- **Theory:** Processes through which intellectual conflict leads to positive outcomes has been theorized by **developmental, cognitive, social, personality, communication, and organizational** researchers (Johnson & Johnson, 2009)
- **Evidence:** 39 studies (41% Higher Ed), meta-analysis
  - Achievement, Retention, and Quality of Decision Making and Problem Solving – Effect Size, ES = 0.70 (concurrence seeking), 0.62 (debate), 0.76 (individualistic)
  - Cognitive and Moral Reasoning – ES = 0.84 (concurrence seeking, 1.38 (debate), 1.10 (individualistic)
  - Similar ES's for Perspective Taking, Open-Mindedness, Creativity, Task Involvement, Motivation to Improve Understanding, Attitude Change on the Issue, Attitudes toward Controversy and Toward the Task, …

Reflection and Dialogue

- Reflect on (~ 30 seconds)
  - Key features and how to cultivate **innovation** in project and team environments
  - Record your ideas
- Turn to the person next to you (~ 1 minute)
  - Exchange ideas
  - Develop a list to share with whole group
- Whole Group discussion (~2 minutes)

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Guide to Increasing Innovation Amabile & Khaire (2008)

- 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

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.

Van de Ven, A.H., Polley, D.E., Garud, R. & Venkataraman, S. 1999. *The Innovation Journey*, Oxford University Press

IDEO – Deep Dive Video

ABC News
Nightline - 7/13/99

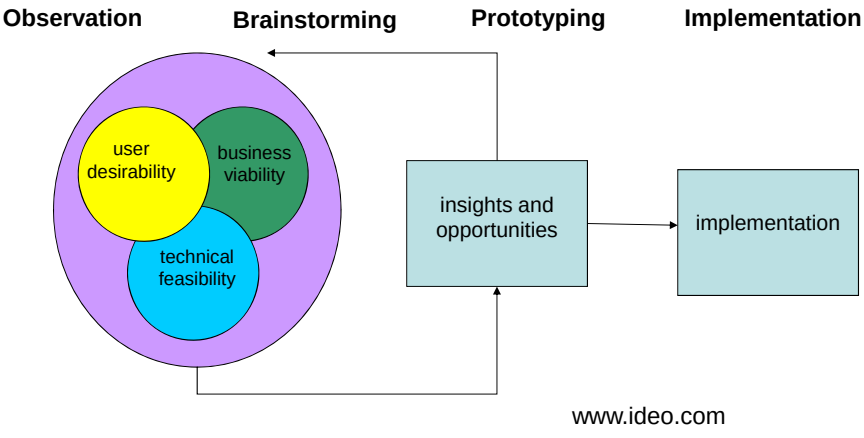
http://vimeo.com/16456835

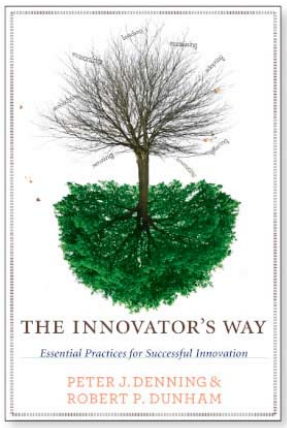
Brown, Tim. 2009. *Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation*. Harper Business

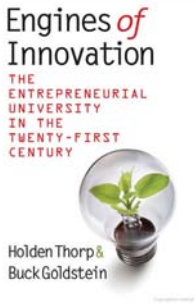
Kelley, Tom and Littman, Jonathan. 2001. *The art of innovation: Lessons in creativity from IDEO, America's leading design firm*. Random House

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

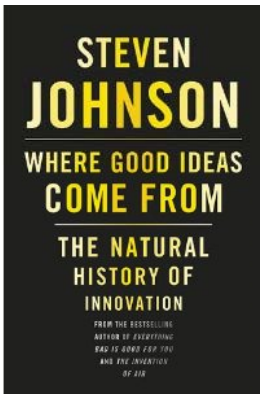
IDEO's Method

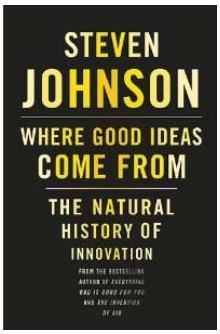




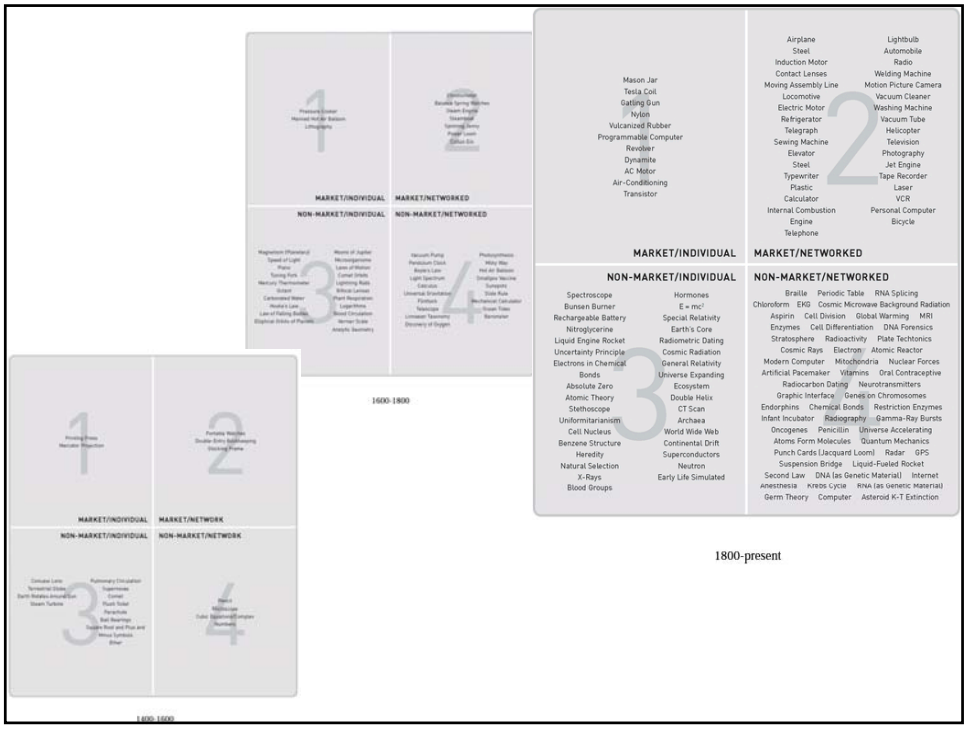


Innovation is the adoption
of a new practice in a community
- Denning & Dunham (2010)





1. What is the distribution of innovations?
2. Did it change over time? If so, how?
3. Where does **your** innovation fit?



Serious Play

Prototyping, Innovation, Collaboration

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

Innovation isn't what innovators *do*....it's what customers and clients *adopt*.

Innovation is more social than personal

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

Project and Knowledge Management

- University of Minnesota – Technological Leadership Institute – Professional MS Programs
  - Management of Technology (MOT)
  - Infrastructure Systems Management & Engineering (ISME)
- Constructive Controversy
  - Rationale
  - Assignment

Types of Projects – Exploitation vs Exploration (March, 1991)

Exploiting Old Ways: Organizing for Routine Work	**Exploring New Ways: Organizing for Innovative Work**
Drive out variance	Enhance variance
See old things in old ways	See old things in new ways
Replicate the past	Break from the past
Goal: Make money now	Goal: Make money later

March, J.G. 1991. Exploration and exploitation in organizational learning. *Organizational Science, 2*, 71-87

Explore - Exploit

- Bledow, R., Frese, M., Anderson, N., Erez, M. & Farr, J. 2009. A Dialectic Perspective on Innovation: Conflicting Demands, Multiple Pathways, and Ambidexterity. *Industrial and Organizational Psychology*, 2(3), 305–337.
- Roger Martin (2010) *Design of Business* – Characteristics of exploration and exploitation, Table 1-1, p. 20
- Govindarajan and Trimble (2010) *The Other Side of Innovation*, Key differences between typical planning processes for the Performance Engine and best practices for innovation, Table 4.1, p. 99
- Scott Page (2010) *Understanding Complexity* – Lecture 5 Explore Exploit: The Fundamental Trade-Off

Characteristics of exploration and exploitation

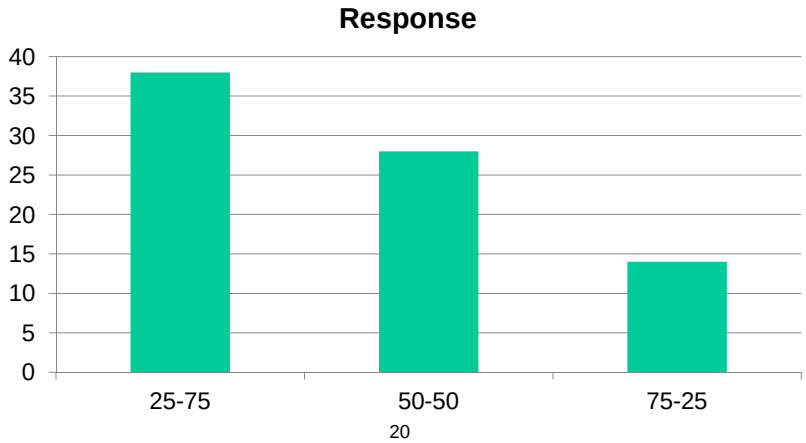
(Martin, R. (2010) *Design of Business*, Table 1.1)

	Exploration	**Exploitation**
Organizational focus	The invention of business	The administration of business
Overriding goal	Dynamically moving from the current knowledge stage to the next	Systematically honing and refining within the current knowledge stage
Driving forces	Intuition, feeling, hypotheses about the future, originality	Analysis, reasoning, data from the past, mastery
Future orientation	Long-term	Short-term
Progress	Uneven, scattered, characterized by false starts and significant leaps forward	Accomplished by measured, careful incremental steps
Risk and reward	High risk, uncertain but potentially high reward	Minimal risk, predictable but smaller rewards
Challenge	Failure to consolidate and exploit returns	Exhaustion and obsolescence

Selecting a Project Management Approach

Process Clarity	Goal/Task/Deliverables Clarity	
	Low	High
High	Adaptive Project Management (APM)?	Traditional Project Management (TPM)
Low		Adaptive Project Management (APM)

Distribution of PM Activity Between Supporting Innovation and Supporting On-Going Operations – 80 Engineers



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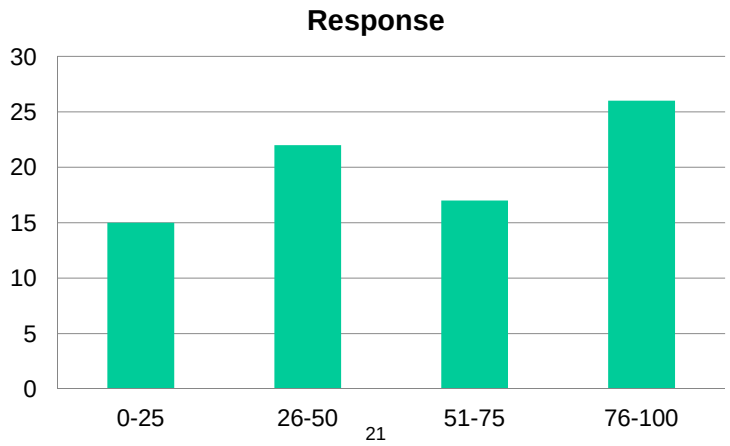
Percentage of Current Work that is Project Work – 80 Engineers



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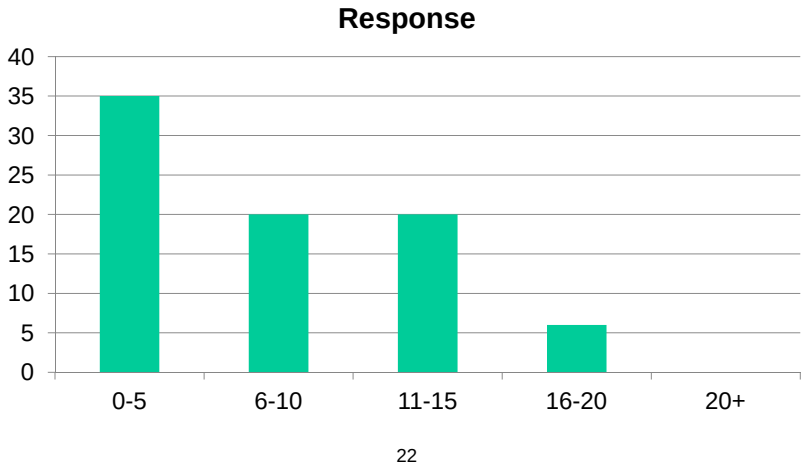
Number of Projects Currently Working On



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Low		Adaptive Project Management (APM)

Constructive Controversy

Project and Knowledge Management Constructive Controversy Topics

- Make project management certification, e.g. PMI-PMP, a part of the MOT program?
  - Yes
  - No
- Who makes the best project manager?
  - Generalist
  - Specialist
- **Brooks**' Law: "**adding resources** to a late project makes it later"
  - Right on!
  - Way off!
- Scope Creep
  - Parkinson's Law: Work expands to fill the time available for completion (manageable)
  - Progressive refinement rules! (unavoidable)
- Peters: "Tomorrow's corporation is a collection of projects"
  - Accurate portrayal
  - Inaccurate portrayal
- The future work environment is remotely distributed
  - Future is already here (it's just not evenly distributed) - Gibson
  - Fad

Constructive Academic Controversy: The Art of Arguing to Enhance Learning

ASEE/IEEE Frontiers in Education
FIE 2009: Special Session

Holly Matusovich, Virginia Tech
Karl Smith, Purdue University/U of MN

Do Outcomes Defined in ABET Define Engineering?

- One pair will argue YES ABET outcomes define engineering
- One pair will argue NO ABET outcomes do not fully define engineering
- Later each team will strive for agreement on what engineering is or on how it can be defined

Two Approaches to Decision Making

Garvin & Roberto, 2001. *Harvard Business Review, 79(8),* 108-116.

	Advocacy	Inquiry
Concept of decision making	A contest	Collaborative problem solving
Purpose of discussion	Persuasion and lobbying	Testing and evaluation
Participants' role	Spokespeople	Critical thinkers
Pattern of behavior	Strive to persuade others Defend your position Downplay weaknesses	Present balanced arguments Remain open to alternatives Accept constructive criticism
Minority views	Discouraged or dismissed	Cultivated and valued
Outcome	Winners and losers	Collective ownership

Controversy References

Garvin, David A. and Roberto, Michael A. 2001. What you don't know about making decisions. **Harvard Business Review, 79** (8), 108-116.

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Thank you!

An e-copy of this presentation will be posted to:
http://www.ce.umn.edu/~smith/links.html

Constructive Controversy for Innovation – Expert Panel

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