

# Fostering Creative Learning

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THE GOP'S REAGAN COMPLEX

WHAT'S EATING LEONARDO DICAPRIO?

JULY 19, 2010

# Newsweek

# CREATIVITY IN AMERICA



**THE SCIENCE OF INNOVATION AND  
HOW TO REIGNITE OUR IMAGINATIONS**

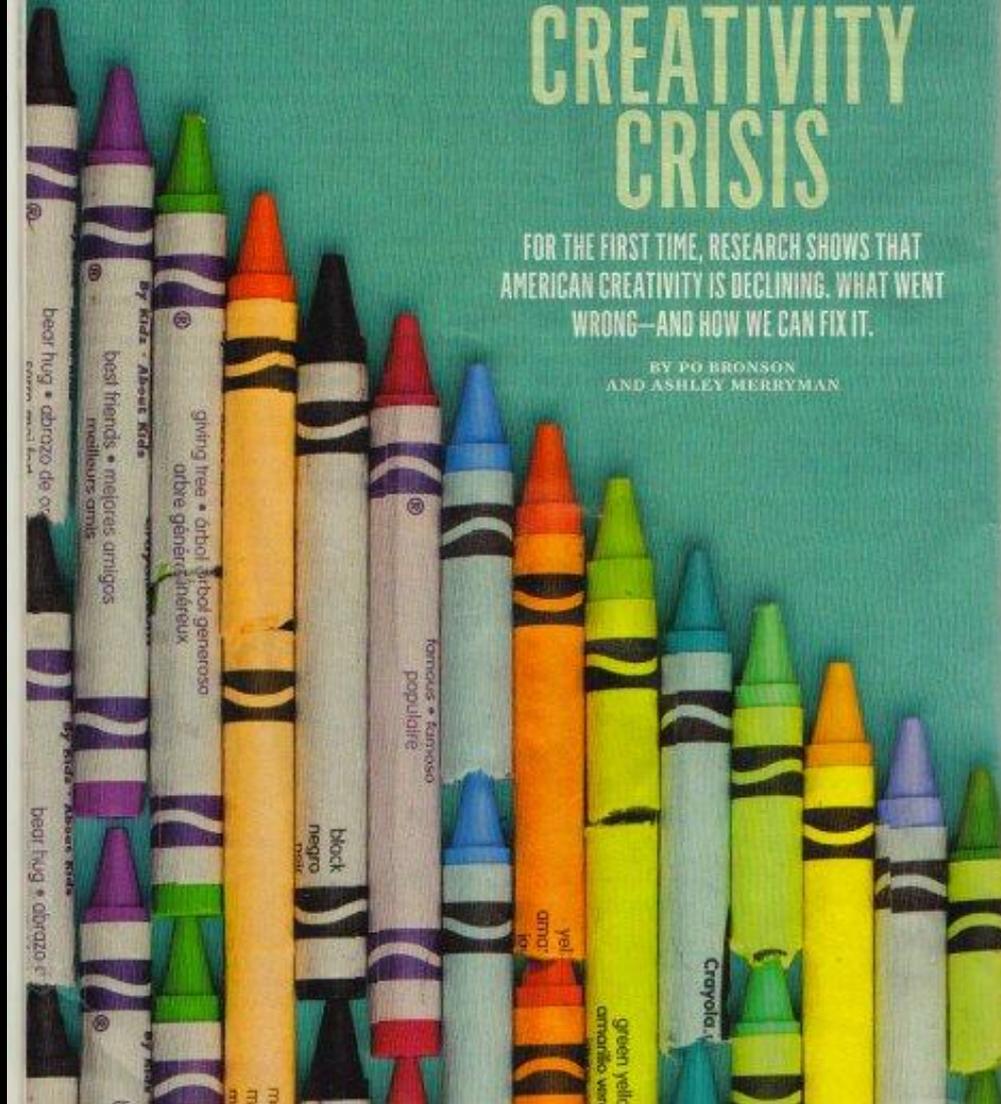
BY PO BRONSON & ASHLEY MERRYMAN

SOCIETY INNOVATION

# THE CREATIVITY CRISIS

FOR THE FIRST TIME, RESEARCH SHOWS THAT  
AMERICAN CREATIVITY IS DECLINING. WHAT WENT  
WRONG—AND HOW WE CAN FIX IT.

BY PO BRONSON  
AND ASHLEY MERRYMAN



75th ANNIVERSARY ISSUE

The McGraw-Hill Companies

# BusinessWeek

OCTOBER 11, 2004

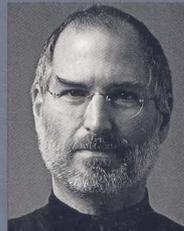
www.businessweek.com

# THE INNOVATION ECONOMY

**SPECIAL REPORT** The technologies and  
new ideas that are changing the world

DISPLAY UNTIL OCTOBER 18, 2004

\$4.95 US \$6.95 CAN 4 1 >



## PLUS Voices of Innovation

STEVE JOBS CRAIG VENTER  
TIM BERNERS-LEE SHIRLEY ANN  
JACKSON YUAN LONGPING  
CHERRY MURRAY JEFF HAWKINS  
ROGER McNAMEE FAQIR CHAND  
KOHLI AMORY LOVINS & MORE

# TAPPING AMERICA'S POTENTIAL

The Education for Innovation Initiative

AeA

Business-Higher Education Forum

Business Roundtable

Council on Competitiveness

Information Technology  
Association of America

Information Technology Industry  
Council

Minority Business RoundTable

National Association of  
Manufacturers

National Defense Industrial  
Association

Semiconductor Industry  
Association

Software & Information  
Industry Association

TechNet

Technology CEO Council

Telecommunications Industry  
Association

U.S. Chamber of Commerce

**GOAL:**

*Double the number of science, technology,  
engineering and mathematics graduates by 2015*

July 2005

educate next-generation innovators  
deepen science and engineering skills  
explore knowledge intersections  
equip workers for change  
support collaborative creativity  
energize entrepreneurship  
reward long-term strategy  
build world-class infrastructure  
invest in frontier research  
attract global talent  
create high-wage jobs

## INNOVATE AMERICA

NATIONAL INNOVATION INITIATIVE SUMMIT AND REPORT  
thriving in a world of challenge and change



2005

EXECUTIVE SUMMARY

# RISING ABOVE THE GATHERING STORM

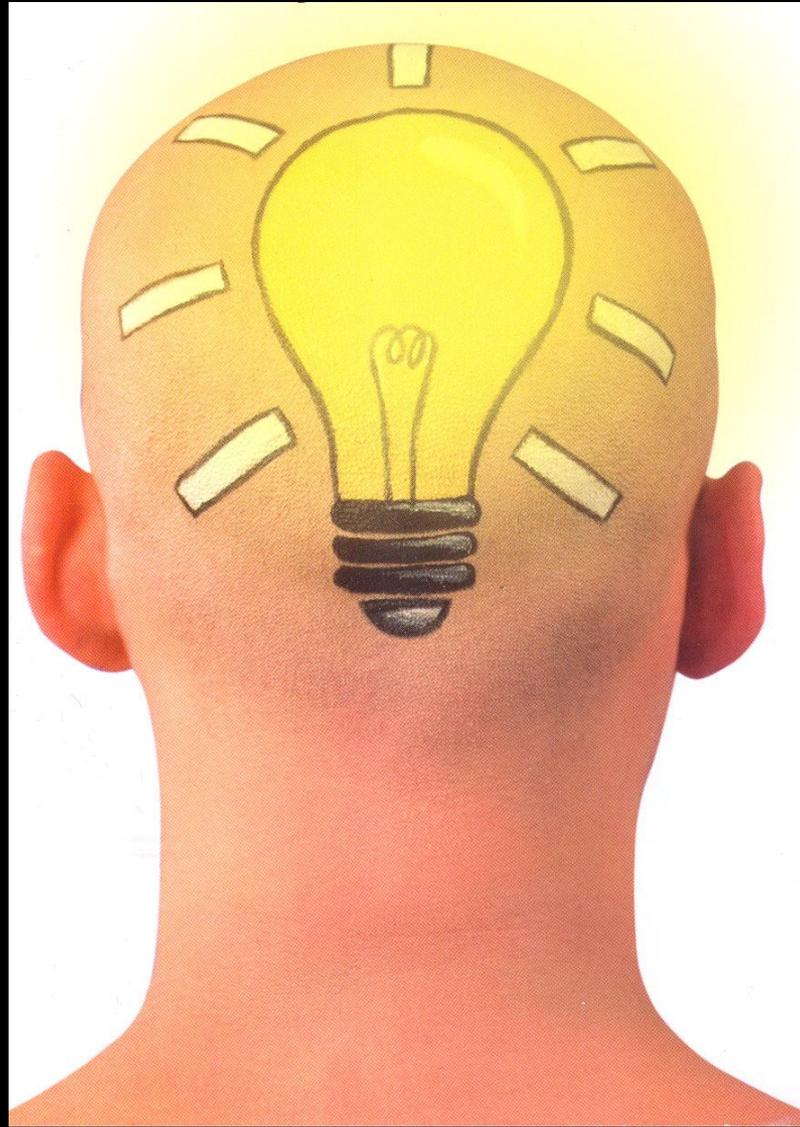
*Energizing and  
Employing America  
for a Brighter  
Economic Future*

NATIONAL ACADEMY OF SCIENCES,  
NATIONAL ACADEMY OF ENGINEERING, AND  
INSTITUTE OF MEDICINE  
OF THE NATIONAL ACADEMIES

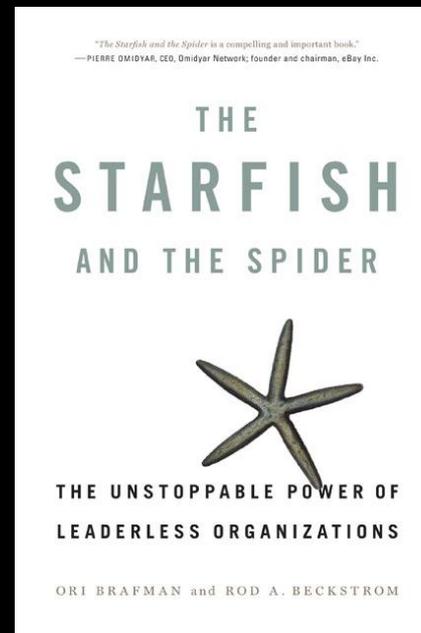
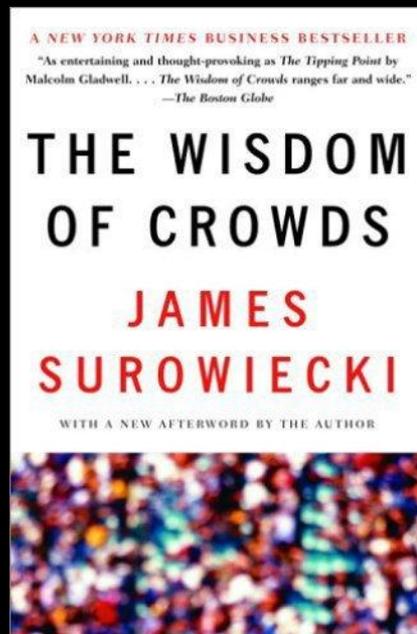
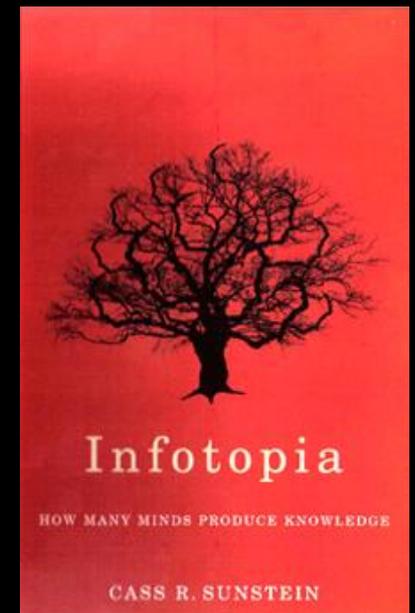
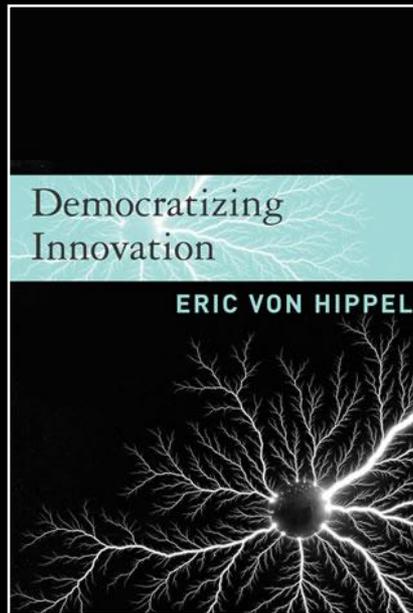
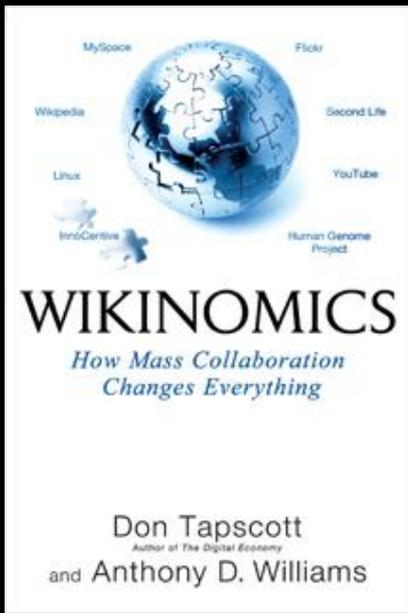
October 2005

- Increased Higher Education quality and funding
- Increased R&D funding
- Better K-12 education

*Missing: An understanding of how innovation works, how people learn for creativity, and how to design creative learning environments*







# Web 2.0

YouTube

Facebook

The Blogosphere

Wikipedia

Flickr

→ *Collective Intelligence*





(Sawyer, 2003, *Improvised Dialogues*, Greenwood)

# The Creative Classroom

- The core is *collaborative conversation*
- Constructivist learning conversations are *improvisational*
- Teacher and students build knowledge together
- Unexpected insights emerge

(Sawyer, 2011, *Structure and Improvisation in Creative Teaching*, Cambridge)

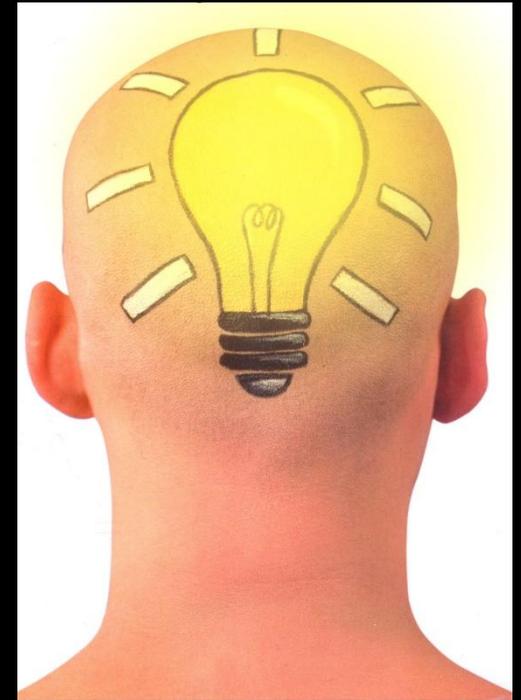


[1]

# Teaching and Learning for Creativity

# Instructionism

- Knowledge is a collection of static facts and procedures
- The goal of schooling is to get these facts and procedures into students' heads
- Teachers know these facts and procedures; their job is to transmit them
- Simple facts and procedures should be learned first
- To evaluate learning, assess how many facts and procedures have been acquired



# Problems with Instructionism

- The knowledge acquired is relatively superficial
- Retention is low
- Transfer to new situations is weak
- Ability to integrate knowledge is weak
- Ability to work adaptively with knowledge is weak

→ *No learning for creativity*

# The Innovative Learner

- Deep understanding of complex concepts
- Ability to manipulate concepts creatively
- Integrated knowledge
- Contextualized knowledge
- Ability to innovate collaboratively



(Sawyer, 2006, *The Cambridge Handbook of the Learning Sciences*)

# Active Learning

- Students work with, and use, facts/skills/concepts as they solve *complex real-world problems*
- Students work in collaborative teams *because the tasks are demanding*
- The professor *guides and supports students* as they work on their projects and problems

# The Key Components

- Start with a problem or design challenge
- Students explore the problem through inquiry and discussion
- Students work to find solutions
- The process must be guided by the instructor
- Students create tangible products that address the problem
- Prototypes and sub-tasks are presented frequently for critique

# Four Challenges For Instructors

1. Identifying a good problem or design challenge
2. Helping students learn actively
3. Fostering effective collaboration
4. Supporting the creation of shared artifacts and effective critiques

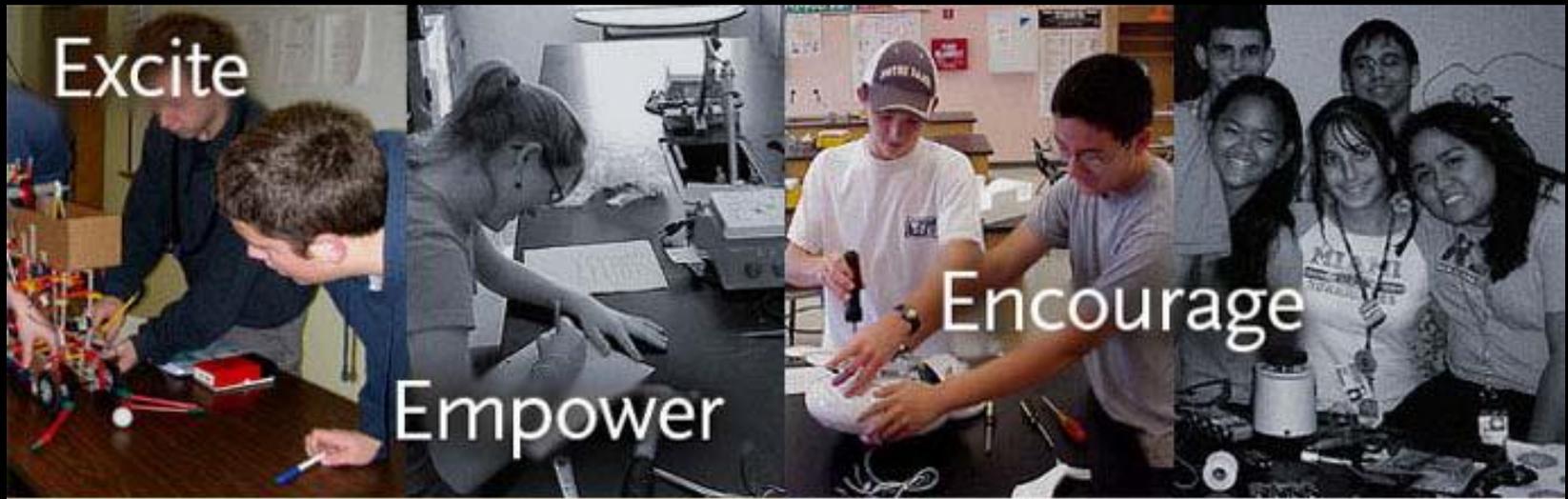
[2]

# Creative Learning Environments

# Interactive Science Centers



# InvenTeams (Lemelson-MIT)



# Integrated Teaching and Learning Laboratory (UC Boulder)



# Wireless Handhelds

The image displays a screenshot of a classroom management software interface. The interface is divided into several sections:

- Student in group:** A central area showing a grid of student avatars, each with a name and a status indicator. Arrows point from this label to the avatars.
- Student groups:** A label pointing to a specific group of avatars in the grid.
- Students yet to be assigned to groups:** A label pointing to a small group of avatars at the bottom left of the grid.
- Observer windows:** A label pointing to several smaller windows on the right side of the interface, which display various data and graphs.

The interface includes a top navigation bar, a central grid of student avatars, and several smaller windows on the right side displaying data and graphs. The windows show various data points, including student names, scores, and graphs of student performance over time.

[3]

The Creative Campus

# Innovative Organizations

*In innovative organizations, professionals:*

- Continually learn
- Work collaboratively
- Engage in “mutual tinkering” where small sparks add up to big ideas
- Change teams, assignments, and organizations frequently

(Sawyer, 2007, *Group Genius*, Basic Books)

# The Creative Campus

- Fluid boundaries
- Flexible organizational structures
- Groups form and disperse spontaneously
- Ideas flow between teams
- Everyone creates

# The Take-Home Message

- Creativity is more important to our students and our society than at any time in history.
- Recent research shows us how to give students the kind of knowledge required to be creative:
- Teachers and students collaborate in creating knowledge together through active problem-based learning.



THANK YOU!

[www.keithsawyer.com](http://www.keithsawyer.com)