

**LEARNING AND THE BRAIN CONFERENCE, Boston, November 18-20, 2011**

A Summary

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**A special 3-day conference brought together leading scholars from many places on this subject, and enrolled 1600 participants (largely classroom teachers) at the Westin Hotel in Boston. Following is a summation of the key points that would be of greatest direct interest to members of the Critical and Creative Thinking Program community, as well as to school leaders and teachers who are committed to enabling students to acquire critical and creative thinking in their lives.**

It is further recommended that the Connecticut State Task Force on Eliminating Achievement Gaps give particular attention to the implications of all of these points for the curriculum of all of the state's schools and the legislation that will support education. These points particularly align well with the recent C.A.P.S.S. Report from the state's superintendents of schools.

The presenters' names, backgrounds, presentation titles, and summary points now follow below:

**7 Survival Skills for Careers, College, and Citizenship**

Prof. Tony Wagner, Harvard University, Technology and Entrepreneurship Center

Critical Thinking and Problem-Solving are essential

Collaboration across networks makes it happen

Characteristics needed:

Agility and Adaptability

Initiative and entrepreneurialism

Assessing and Analyzing Information

Curiosity and Imagination

Effective Oral and Written Communication

5 Habits of Mind— Weighing Evidence

Awareness of Varying Viewpoints

Seeing Connections

Speculating on Possibilities

Assessing Value, socially and personally

## **Neuroplasticity in the Brain**

Helen Neville, Ph.D., Brain Development Laboratory, University of Oregon

Training parents in cognitive strategies will change their parenting behaviors and stress levels.

## **A New Essential for a New Time**

Heidi Jacobs, Ph.D.

2 myths:

We're better off if we all think alike—and not too much  
Too much creativity is dangerous—and the arts are frills

## **21<sup>st</sup> Century Skills: The Imperative for Teaching Creativity and Innovation in Schools**

Charles Fadel, MBA

We are educating students for a future and for problems that we haven't even heard of yet.  
Most young people today want to learn SOCIALLY.

## **Tips for Enhancing Creativity in the Classroom**

Shelley Carson, Ph.D., Harvard University Department of Psychology

Creative cognition includes: divergent thinking, forming associations between distantly-related items, thinking in metaphors, using mental visualization, and imagination.

Cognitive flexibility is the ability to switch from one thinking style to another—a hallmark of creative thinking.

Creative process involves preparation, incubation, insight, solution, evaluation, elaboration, and implementation.

## **21<sup>st</sup> Century Learning: Implications for Teaching**

Christopher Dede, Ph.D., Harvard University

Digital Life outside of class:  
all information is instantly available  
distance and time don't matter  
multi-tasking is how people work  
machines have “intelligence”  
powerful tools for creative work are taken for granted  
options are abundant  
multimedia interactive entertainment is omnipresent  
change is constant and rapid

**A New Culture of Teaching for the 21<sup>st</sup> Century**

Stone Wiske, Ph.D.

We need 3 networks—recognition, use of strategies, and affect—all need to be engaged

**How Visual Arts Teaching Can Promote Disciplined Habits of Mind**

Ellen Winner, Department of Psychology, Boston College

Relationship between academic skills and classroom activities in the arts:

Classroom drama improves verbal skills

Listening to music improves spatial reasoning

Making music improves spatial reasoning

**The Development of Argument Skills in Students**

Deanna Kuhn, Ph.D.

The development of argument skills requires peer dialogues

Argument skill development leads to increasing frequency of using powerful discourse strategies and improved supports for claims made

**Brain-Based Teaching Strategies to Build Executive Functions in Students**

Judy Willis, M.D.

Judgment

Prioritizing

Setting Goals, providing feedback, and monitoring progress

Activating prior knowledge and transfer opportunities

Metacognition

**Critical Thinking: Why is it so Hard to Teach?**

Daniel Willingham, Ph.D., University of Virginia

Critical thinking is not a set of skills—it is a type of thought

3 types of thinking—reasoning, making judgments, decision-making

3 key features of critical thinking –effectiveness, novelty, self-direction

Critical thinking should be taught in the context of subject matter

Strategies should be made explicit and be practiced regularly

## **Future Minds and Skills**

Ellen Galinsky, M.S.

7 skills essential to success

focus and self-control  
perspective-taking  
communicating  
making connections  
critical thinking  
taking on challenges  
self-directed engaged learning

## **Panel discussion—how to teach critical thinking**

increase length of school day  
more teacher content knowledge  
change policies  
scaffold  
focus on functions  
model the skills

## **Creativity and Education**

Mark Runco, Ph.D., California State University at Fullerton

Creativity is not always problem-solving  
Both convergent and divergent thinking are needed  
Tactics—shift perspectives, work backward, enlarge or reduce its size,  
take time and put problem aside temporarily,  
change the problem, question assumptions, modeling;  
ego-strength or self-confidence is needed  
Creativity is basically an individual accomplishment, and is  
not the result of group brainstorming

## **How is Critical and How can we Teach it?**

Robert Swartz, Ph.D., Director of National Center for the Teaching of Thinking

A thinking skill results from engaging in one or another type of thinking  
3 domains or types of thinking—generating ideas, clarifying ideas,  
assessing the reasonableness of ideas  
We operationalize skillful thinking by teaching students a set of questioning strategies

## **Brain-Targeted Teaching Model**

Mariale Hardiman, Ph.D.

Targets—Emotional Climate  
Physical Environment  
Learning Design  
Teaching for Mastery  
Teaching for application  
Evaluating Learning

## **Five Minds for the Future**

Howard Gardner, Ph.D., Harvard University; author of Multiple Intelligences

4 Megatrends as the context for the Five Minds—

globalization  
biological revolution  
digital revolution  
lifelong learning

The 5 Minds—Disciplinary: steady work, becoming expert, learning major ways of thinking (history, math, etc.), focus on the traditional disciplines; learning to think probably CAN'T be done on-line

--Synthesizing: lots of information, different kinds of syntheses; methods involve mind-mapping, equations, narratives, images, schemata, taxonomies, metaphors, systems

--Creating: mastering a discipline (usually takes 10 years), synthesizing, going beyond the known, asking good questions, being judged by the field, risk-taking, innovation; creativity is partly personality-based

--Respectful: diversity is everywhere; moving beyond mere tolerance, understanding others' perspectives, learning from bottom-up, conciliation

--Ethical: a higher level of abstraction than the Respectful Mind, conceptualizing the self as a good worker and citizen, acting appropriately, moving around fear and greed.

In the Digital Age:

Disciplinary depth could lose out to breadth

Synthesis of too much information

Creativity is inhibited by the young being averse to risk-taking; web 2.0 is promising

Respectful and Ethical require moving beyond the inner circle

Figure-Ground Struggle

The figure—will it be test scores and counting comparative school rankings?  
or instead the kind of individual and society that we really need?

Check websites: [goodworktoolkit.org](http://goodworktoolkit.org) and [goodworkproject.org](http://goodworkproject.org)

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It is now recommended that specific programs for teaching critical and creative thinking be seriously considered for implementation within schools. One such program which has yielded consistently positive results and is well-researched is “**Instrumental Enrichment**”, authored by Israeli psychologist Reuven Feuerstein. Well over 1000 research studies have documented its positive effects with a wide variety of populations. The proposal for **The Thinking Academy**, available at the address below, is another means of organizing a school-wide commitment for infusing cognitive education across the curriculum. For information, see the website [www.ictaweb.org](http://www.ictaweb.org) or contact [davidmartindr@aol.com](mailto:davidmartindr@aol.com); cell phone--508-527-0460.

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