APPLYING DELIBERATE CREATIVE PROBLEM SOLVING TOOLS AND PROCESS IN EDUCATION

Alex Osborn, an advertising executive with BBD&O coined the term brainstorming and developed a deliberate Creative Problem Solving (CPS) process in the 1940's in Buffalo. Together with Sidney Parnes, a university professor, he continued the development and use of creative process and tools for divergent and convergent thinking in both business and educational settings.

As a direct result of their work, the first and oldest higher education degree program in creativity emerged. Today, Buffalo State has a home and distance Master of Science in Creativity and A State University of New York Advanced Certificate in Creativity and Change Leadership in addition to an undergraduate minor in both creativity and leadership. The Creative Studies Collection at Butler Library houses the largest collection of literature on creativity in the world and the International Center for Studies in Creativity is home to the oldest academic journal in creativity, the *Journal of Creative Behavior*.

EMERGING CREATIVITY EDUCATION & RESEARCH SUPPORT

Support for creativity education has varied over time depending on the degree to which the latest educational movements and philosophies embrace the importance of creative thinking and problem solving. Puccio and Keller-Mathers (2007) argue that it is possible to embrace creative learning in very diverse educational contexts that hold to a wide variety of educational philosophies as long as the importance and potential of teaching creative thinking is recognized.

EARLY DEVELOPMENT OF CREATIVITY CONCEPTS AND MATERIALS

Guilford (1968, 1977) developed the Structure of Intellect (SOI), broadening the concept of intelligence to 150 components, including aspects of creativity. He contended that intelligence is not information itself, but rather a collection of abilities or functions for processing information. Abilities differ with respect to kinds of information, and to kinds of operations we perform with information. His work articulated thinking related to the operations of divergent and convergent production of ideas. Meeker (1969) developed practical applications of Guilford's theory which today include a worldwide network of SOI institutes for both educational and business applications of the model to improve intelligence and creativity www.soisystems.com.

Structure of Intellect Model

Model Adapted from Guilford (1977)

Around the same time as Guildford's developments, Calvin Taylor (1968) identified multiple talents that included creativity as an essential aspect of his theory. The talents included

- Academics
- Creativity/Productive Thinking
- Decision Making
- Planning
- Forecasting
- Communication
- Implementing
- Human Relations
- Discerning Opportunities

Taylor identified creativity as; generating many, varied ideas or solutions and adding details to improve them. Schlichter (1986) further developed Taylor's concepts into the Talent's Unlimited Program to utilize his work in educational settings.

THE CLASSIC CREATIVE STUDIES PROJECT

Initial work within educational systems focused on the development and use of the CPS material and instruction with university students (Parnes, 1987; Parnes & Noller, 1972). Research begun in 1957 and culminating in the four semester Creative Studies Project in the early 1970's examined the effect of creativity training on undergraduate students. Since this early work, CPS material and instruction have been adopted in classrooms from early childhood through higher education and adult learning.

- As a result of the Creative Studies Project, students in the Creative Courses Outperformed the students who did not take Creative Courses on
  - ✓ 16 of 27 semantic tests
  - ✓ 7 out of 10 cognition tests
  - ✓ 9 out of 14 divergent production tests
  - ✓ 4 out of 8 convergent tests
  - ✓ Also did better on creativity-related tests given as part of their English courses
- Most students reported large gains in their own productive, creative behavior and problem-solving (Parnes, 1987)

ADDITIONAL SUPPORT FOR TEACHING FOR CREATIVITY

CPS has been one of the most widely used creativity training programs in classrooms. Early research in creativity in education included Torrance's (1972) analysis of 142 creativity studies. In this study Torrance set out to answer the question "Can we teach children to think creatively?" Torrance later (1987) examined 166 additional studies. Torrance concluded that CPS training had an 88% success rate. This was higher than other creativity training programs such as the Purdue Creativity Program.

In 1988 John Baer examined the effects of creativity training on 48 students from two classes of high ability 8th graders. Instruction for the experimental group consisted of CPS training delivered over three days and two nights at an outdoor school. Students worked on both subject related problems as well as challenges produced by the students' real life experiences. A pre and post test was administered that consisted of four parts: data finding, problem finding, idea finding, and solution finding. The post test was given six months after training and showed an average gain of 19.1% for the experimental group.

Manning (1984) examined whether problem solving instruction would positively influence oral comprehensive among 100 reading disabled 3rd graders. Four groups consisting of a control group, and CPS group, a cognitive monitoring group and a group who received both treatments were administered the Boehm Test of Basic Concepts. CPS training involved 30 minute training sessions carried out over a ten day period. The results for the treatments showed higher mean scores on the Boehm test than the control with the combination group showing consistently higher men scores than the others.

CREATIVITY CURRICULUM IN HIGHER EDUCATION

In 2010, the International Center for Studies in Creativity at Buffalo State College celebrated its 35th year as the oldest and first Master of Science in Creativity program and undergraduate minor in Creative Studies (1975-2010).

A MASTER OF SCIENCE DEGREE IN CREATIVITY: AN OVERVIEW OF COURSES IN HIGHER EDUCATION

The Master of Science Program is a 33 credit hour program offered by the Creative Studies Department. The department, through the process of creative thought, enhances an individual's ability to imagine new ideas by learning how to envision that which cannot be immediately seen. These unique graduate programs attract students internationally from many diverse fields including business, education, the arts and not-for-profits. It includes the following courses:

Foundations of Creativity Strand		
CRS/EDL 560 Foundations of Creative Learning	**CRS 625** Current Issues in Creativity Studies	**CRS 635** Creativity and Change Leadership

Creative Problem Solving & Facilitation Strand		
CRS/EDL 559 Principles in Creative Problem Solving	**CRS 610/EDL 683** Facilitation of Group Problem Solving	**CRS 670** Foundations in Teaching and Training Creativity

Master of Science in Creativity Research, Development and Dissemination Strand	
CRS 580 Creativity Assessment: Methods and Resources	• **CRS 795** Master's Thesis • **CRS 690** Master's Project • Comprehensive Exam

A SUNY ADVANCED CERTIFICATE IN CREATIVITY AND CHANGE LEADERSHIP

The graduate certificate program in Creativity and Change Leadership is an 18 credit hour program offered by the Creative Studies Department. Ongoing development of leadership models during the last century has drawn a close connection between creativity and leadership. At the core of many current leadership models is the concept of change—how to foster and manage it. This concept is clearly reflected in the language used to describe the essence of leadership today. For instance, many leadership theories focus on visionary, transformational, and change leadership. In addition, the view that leadership consists of a set of specific attributes that one has or does not have has shifted to a view that leadership skills can be learned. The ability to think creatively is an essential leadership skill: the creative process brings about change. Often, a leader must act as a catalyst for change. Thus, it is imperative for leaders to learn how to facilitate their own creative thinking, as well as those they work, with to bring about productive change (i.e., new products, services, resolution to problems, opportunities, etc.).

The purpose of the State University of New York graduate certificate program in creativity and change leadership is to provide students with the knowledge and skills that can put them in a better position to operate as change leaders. The courses include CRS 559,560,580,610,635 and either 625 or 670.

The Creative Problem Solving (CPS) model is built on our natural creative processes. The Thinking Skills Model is a comprehensive cognitive and affective system designed to deliberately ignite creative thinking resulting in the generation of solutions and positive change that includes three steps:

Step 1: Clarification Stage - "What needs to be resolved?" Includes exploring the vision and formulating challenges.

Step 2: Transformation Stage - Identify ideas & craft into solutions. Includes exploring ideas and formulating solutions.

Step 3: Implementation Stage – Refine solutions & create action plan. Includes exploring acceptance and formulating a plan.

Creative Problem Solving: The Thinking Skills Model
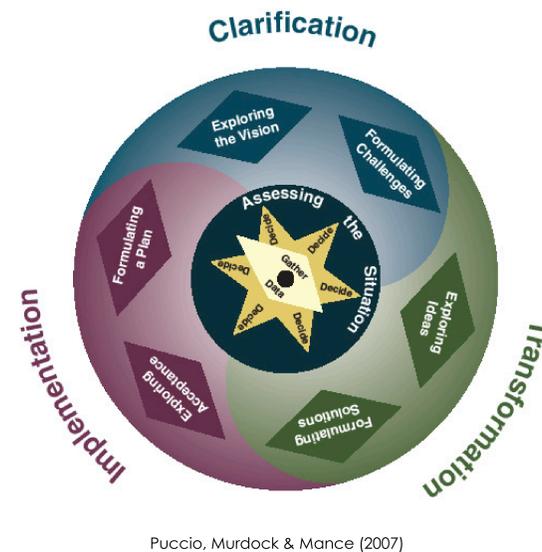
Puccio, Murdock & Mance (2007)

At every stage, you may step into the circle, as needed, to gather data and assess the situation. Every step of the process calls for a broad search for many diverse and novel ideas (divergent thinking) and selecting options through an affirmative evaluation of alternatives (convergent thinking).

Divergent and Convergent Principles

To Diverge...
- Defer Judgment
- Go for Quantity
- Make Connections
- Seek Novelty

To Converge...
- Apply Affirmative Judgment
- Keep Novelty Alive
- Check Your Objectives
- Stay Focused

Wild Card Principle:
- Allow for Incubation

Creative Leadership: Skills That Drive Change by Puccio, Murdock, & Mance (2007)
Based on Isaksen & Treffinger (1985); Miller, Vehar, & Firestien (2001); Osborn (1963)

The Thinking Skills Model articulates specific thinking skills that are essential to various aspects of the process. They include both cognitive skills and affective skills. Further, three overarching affective skills, openness to novelty, tolerance for ambiguity and tolerance for complexity provide key insights into one's readiness to engage in creative activities.

Thinking Skills Associated with CPS

Thinking Skill	Definition
Diagnostic	Making a careful examination of a situation, describing the nature of a problem and making decisions about appropriate process steps to be taken
Visionary	Articulating a vivid image of what you desire to create
Strategic	Identifying the critical issues that must be addressed and pathways needed to move toward the desired future
Ideational	Producing original mental images and thoughts that respond to important challenges
Evaluative	Assessing the reasonableness and quality of ideas in order to develop workable solutions
Contextual	Understanding the interrelated conditions and circumstances that will support or hinder success
Tactical	Devising a plan that includes specific and measurable steps for attaining a desired end and methods for monitoring its effectiveness

Affective Skills that Support CPS

Affective Skill	Definition
Curiosity	A desire to learn or know; inquisitive
Dreaming	To imagine as possible your desires and hopes
Sensing Gaps	To become consciously aware of discrepancies between what current exists and what is desired or required
Playfulness	Freely toying with ideas
Avoiding Premature Closure	Resisting the urge to push for a decision
Sensitivity to Environment	Awareness of your physical and psychological surroundings
Tolerance for risk taking	Not being shaken or unnerved by the possibility of failure or setbacks

Three overarching affective skills, openness to novelty, tolerance for ambiguity and tolerance for complexity provide key insights into one's readiness to engage in creative activities.

Affective Skills that Support all CPS Steps and Indicate "Readiness" to Engage

Affective Skill	Definition
Openness to Novelty	Able to entertain ideas that at first seem outlandish and risky
Tolerance for Ambiguity	Able to deal with uncertainty and avoid leaping to conclusions
Tolerance for Complexity	Able to stay open and persevere without being overwhelmed by large amounts of information, interrelated and complex issues, competing perspectives

Creative - Production of new and useful ideas or options.
Problem - A gap between what you have and what you want.
Solving - Taking action.
Process - Steps; a method of doing something.

Source: Creative Leadership: Skills that Drive Change Puccio, Murdock, Mance (2007)

References:

Baer, J.M. (1988). Long-term effects of creativity training with middle school students. Journal of Early Adolescence, 8, 183-193.

Guilford, J. P. (1968). Intelligence, creativity and their educational implications. San Diego, CA: Knapp.

Guilford, J. P. (1977). Way beyond the IQ. Buffalo, NY: Bearly Limited.

Manning, B H. (1984). Problem-solving instruction as an oral comprehension aide for reading disabled third graders. Journal of Learning Disabilities, 17, 457-461.

Meeker, M. (1969). The structure of intellect: It's interpretation and use. Columbus, OH: Merrill.

Parnes, S. (1987). The creative studies project. In S. Isaksen (Ed.), Frontiers of creativity research: Beyond the basics (pp. 156-188). Buffalo, NY: Bearly Limited.

Parnes, S. & Noller, R. (1972). Applied creativity: The creative studies project. Journal of Creative Behavior, 6, 11-22.

Puccio, G. & Keller-Mathers, S. (2007). Enhancing thinking and leadership skills through creative problem solving. In Ai-Girl et al. (Eds.), Creativity: A handbook for teachers (pp. 281-301). Singapore: World Scientific.

Puccio, G., Murdock, M. & Mance, M. (2007) Creative leadership: Skills that drive change. Thousand Oaks, CA: Sage.

Osborn, A. (1953). Applied imagination. New York, NY: Scribner's Sons.

Schlichter, C. (1986). Talent's unlimited. In J. Renzulli (Ed.) Systems and models for developing programs for the gifted and talented (pp. 352-390). Mansfield Center, CT: Creative Learning Press.

Taylor, C. W. (1968). Cultivating new talents: A way to reach the educationally deprived. Journal of Creative Behavior, 2(2), 83-90.

Torrance. E. P. (1972). Can we teach children to think creatively? Journal of Creative Behavior, 6, 114-142.

Torrance, E. P. (1987). Teaching for Creativity. In S. Isaksen (Ed.), Frontiers of creativity research: Beyond the basics (pp. 189-204). Buffalo, NY: Bearly Limited.