Creative Problem Solving

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Special thanks to Allan Eller for his assistance in preparing this third edition of
Creative Problem Solving.

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About the Authors

William E. Mitchell and Thomas F. Kowalik

Bill introduced Tom to creativity in the mid-1980s and since that time they have team-taught numerous workshops. Their work together has included the creation of a graduate level course in Creativity and Innovation, many special professional development workshops, and this workbook. They have taught creative problem solving and creativity classes to thousands. Both have worked as consultants to major international corporations, the U.S. Armed Services, and public sector organizations.

Bill is a management consultant, trainer, and former manager for the IBM Corporation. He has been developing training and education programs and conducting workshops and classes in a variety of subject areas for over thirty years. A small sample of these include: Communications; Effective Presentations; Leadership; various management topics; Performance Planning and Counseling and Evaluation; Creativity; Odyssey of the Mind; Professional Image; and Creative Problem-Solving. For the past 28 years, Mr. Mitchell has been a staff instructor at the annual Creative Problem-Solving Institute at State University College at Buffalo, NY. He has also been honored by being named a colleague of the Creative Education Foundation at Buffalo, and in 1986 he was given a service and commitment award by the Foundation for his endeavors in the field of creativity.

Tom leads a team of professionals who develop and conduct programs offering special services to industry and business. He acts as leader and catalyst for special planning, innovation, and creativity activities. His current activities include team and group facilitation, course design, and conducting seminars on Creative Problem Solving, Team Problem Solving, Strategic Planning, Course Design (using a Systems Approach to Education), Training for Trainers, Communication Techniques, Questioning Techniques, Effective Presentations, and selected topics in Binghamton University's award winning Technical Leadership Program. He received the 1990 Region II National University Continuing Education Association (NUCEA) Professional Continuing Educator Award, the 1991 NUCEA Adelle Robertson Leadership Award, and is listed in the 1992-93 Edition of Who's Who in American Education and the 1994 Edition of Men of Achievement.

Creative Problem Solving

Creative Problem Solving is a way of thinking and behaving. The following definitions allow for a common understanding of some terms that are used as the foundation for this workbook.

CREATIVE an idea that has an element of newness or uniqueness, at least to the one who creates the solution, and also has value and relevancy.

PROBLEM any situation that presents a challenge, an opportunity, or is a concern.

SOLVING devising ways to answer, to meet, or to resolve the problem.

Therefore, CREATIVE PROBLEM SOLVING or CPS is a process, method, or system for approaching a problem in an imaginative way and resulting in effective action.

The Creative Problem Solving process presented in this workbook is known as the Osborn-Parnes problem-solving model. This particular model uses the following steps:

1. Mess Finding — an effort to identify a situation that presents a challenge.
2. Data Finding — an effort to identify all known facts related to the situation; to seek and identify information that is not known but essential to the situation is identified and sought.
3. Problem Finding — an effort to identify all the possible problem statements and then to isolate the most important or underlying problem.
4. Idea Finding — an effort to identify as many solutions to the problem statement as possible.
5. Solution Finding — using a list of selected criteria to choose the best solution(s) for action.
6. Acceptance Finding — making every effort to gain acceptance for the solution, determine a plan of action, and implement the solution.

Although CPS can be applied individually, problems are often most effectively solved in a team, where brainstorming allows for more ideas to be generated. Thinking of many ideas is critical to effective problem solving using the Osborn-Parnes model.

Ground Rules for Creative Problem Solving

For Effective Brainstorming:

1. Quantity is needed--originality comes out of fluency
2. Freewheeling is welcome--far-out ideas are O.K.
3. Criticism is ruled out--all ideas are acceptable
4. Combination and improvement are sought--in order to create spin-off from the ideas of others.
5. To stimulate ideas:
   - Substitute
   - Combine
   - Adapt
   - Modify
   - Magnify
   - Minify
   - Put to other uses
   - Eliminate
   - Reverse

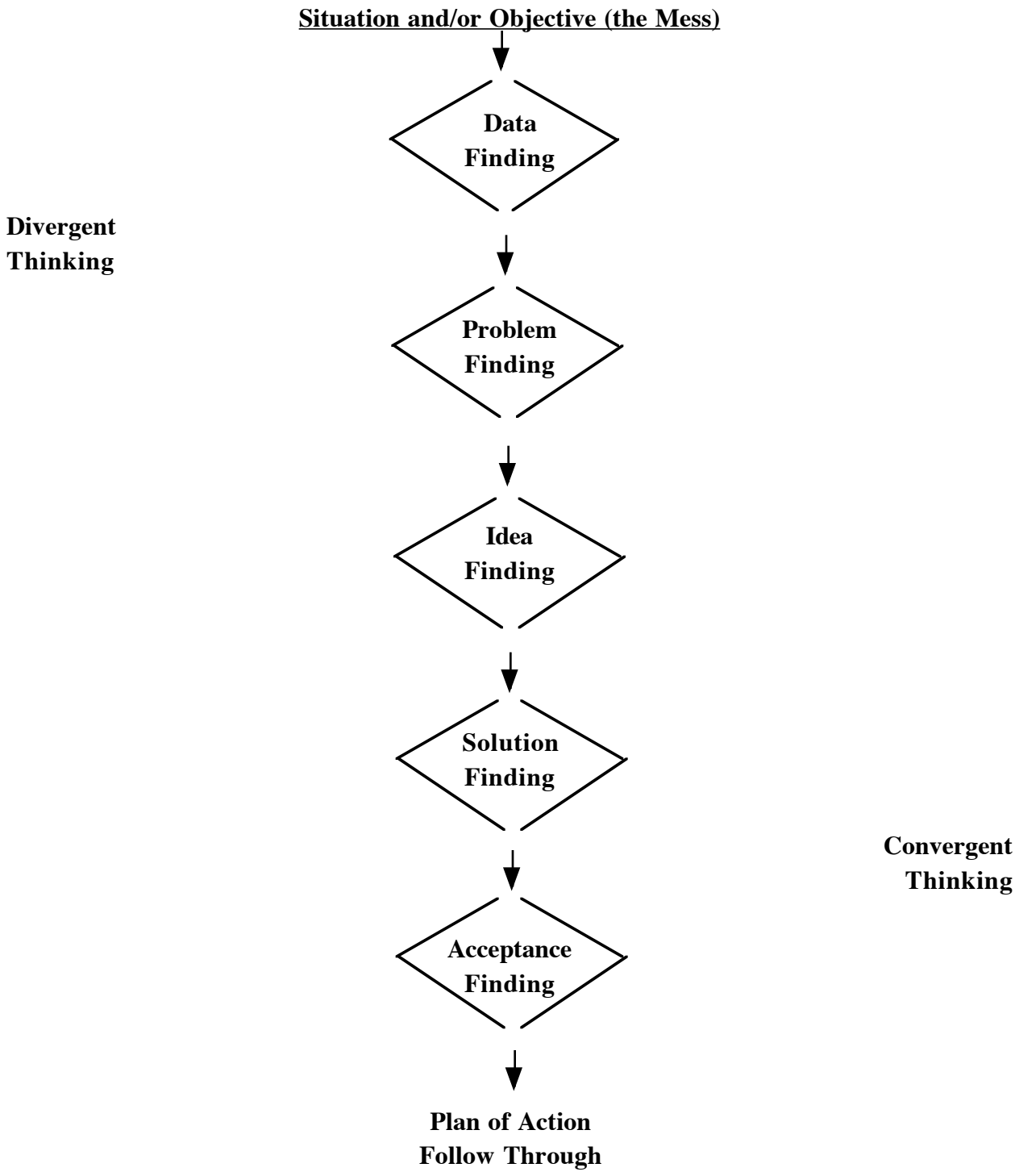
For Effective Divergent Thinking:

1. Defer Judgment
2. Look for Lots of Ideas
3. Accept all Ideas
4. Make yourself STRETCH for Ideas
5. Take Time to let Ideas Simmer
6. Seek Combinations--be a Hitchhiker

For Effective Convergent Thinking:

1. Be Deliberate
2. Be Explicit
3. Avoid Premature Closure
4. Look for Sneaky Spots
5. Develop Affirmative Judgment
6. Don't Lose Sight of Your Goals

A Whole Brain Approach to Problem Solving



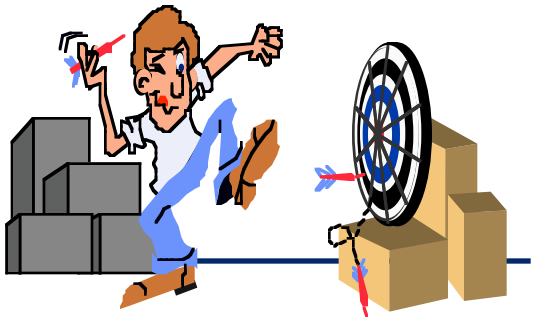
Mess Finding

State the Situation:

The first step in taking action is to identify a situation which presents a challenge… an opportunity… or is a concern that you want to do something about or is an objective you desire to attain.

When you recognize a messy situation, it is helpful to write a brief abstract that captures the essence of what is happening right now--or what is not occurring that should be.

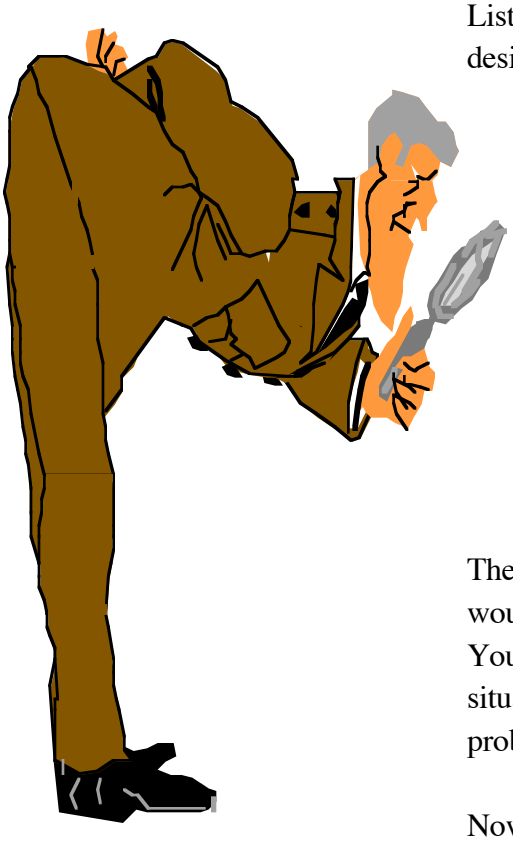
Write your concerns, thoughts, and the changes you would like to see in your situation. LET YOUR THOUGHTS FLOW. Describe the situation in a three sentence overview.



Questions that might be helpful include the following: What do you stand to lose if something is not done about the problem? What have you already tried? What good is coming from the current situation?

Now, summarize and restate the problem using a "How to…" statement.

Data Finding



List all the key facts associated with your situation or your desired objective as you perceive them. Ask yourself:

Who is involved?
What is involved?
What are some examples of the problem?
What causes the problem?
When will it happen?
Where does it or will it happen?
How does it or will it happen?
Why does it happen?
Are there any more problems caused by the situation?

Then ask questions pertaining to what additional facts you would like to know and where you might search for them. Your goal is to have all the knowledge pertinent to the situation so that you can identify and define the key problems.

Now use DIVERGENT THINKING to brainstorm all the known facts. List known facts in the space below.

_____
_____
_____
_____
_____

What facts are lacking? Who has the answer? List them below.

_____
_____
_____
_____
_____

Now, apply CONVERGENT THINKING to judge and select the most important facts. Circle most significant facts and those that provide a key to your situation.

Problem Finding

Considering the data you have gathered about your situation during Fact Finding, determine what you want to accomplish in more specific terms. Ask yourself the following questions:

What is the real problem?
What is my objective?
What do I want to accomplish?
What are my concerns?
What is my challenge?
What wish would I like to fulfill?

This step involves DIVERGENT THINKING, so record as many different problem statements as you can. Begin each statement with the phrase "In What Ways Might We…" (IWWMW) or "How Might I…" (HMI...).

S-T-R-E-T-C-H…Try to create more problem statements. Read over each statement above and ask yourself why you feel it might be the problem. Your answer might reflect another reason, wish, desire, concern, or need.

Now, use the answers to generate more problem statements--beginning with IWWMW…

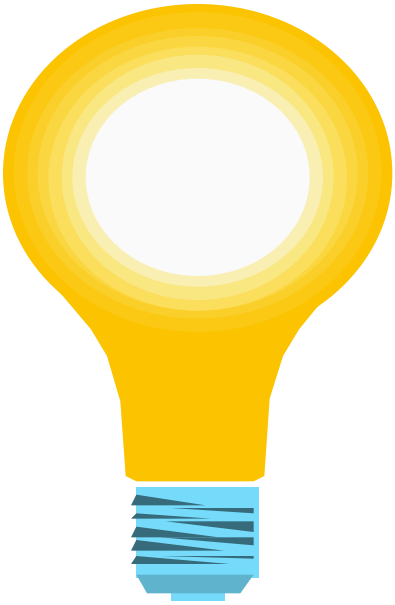
More
Problem Finding

Now apply CONVERGENT THINKING to judge and select the most important problem statement.

Review all your problem statements and select the one statement or combination of statements that best describes the real problem. Determine which statement you believe will provide the most benefits when solved.

Rewrite the selected problem statement. Make sure that your statement calls for ideas to answer it.

Idea Finding



Try to answer your problem statement with many ideas in as many different ways as possible. DIVERGENT THINKING, combined with deferred judgment, is critical in this step. Your goal is to generate lots of ideas. It is often helpful to set a number goal before you start listing ideas. Try for 50-75 ideas before you discuss each and become selective.

The essence of the deferred judgment principle is to allow a period of time for listing all the ideas that come to mind without judging them. Quantity of ideas and complete freedom of expression without any evaluation are key concepts. S-T-R-E-T-C-H your mind to break old habits of thinking.

Feel free to combine or modify any ideas to produce additional ideas. Divergent behavior must prevail. Let your ideas flow freely without internal or external criticism. If time permits, incubate--let the problem and ideas rest in your subconscious for a time--to generate additional ideas.

Let your divergent process create ideas. Start listing them below--continue on additional sheets of paper. RECORD ALL IDEAS.

Preliminary Judgment

Using your convergent skills, review all your ideas and circle six to eight that seem to have the greatest potential.

Solution Finding

You must now decide what criteria, standards, or "yardsticks" should be applied to weigh the worth of your selected ideas. These criteria will be used to determine the best solution(s) to your problem.

Your ideas affect cost, time, reliability, quality, morale, customers, legality, safety, company practices and approvals, feasibility, timeliness, and ease of implementation. Any or all of these, as well as others, can be considerations for criteria.

Let your DIVERGENT THINKING create a preliminary list of factors or criteria that will be used to evaluate your ideas. Write the list below.

_____
_____
_____
_____
_____
_____
_____
_____

Selection of Criteria

Using your CONVERGENT THINKING, review your criteria listed above and circle the five or six which you feel to be the most critical for evaluating your ideas.

Now, use a 10-point scale to weight your selected criteria (10 is high).

When you are satisfied with your criteria, record them on one axis of the decision matrix on the following sheet. Then record your selected ideas on the other axis.

More Solution Finding

		Criteria							
Ideas	**Weight**								**Totals**

Using your CONVERGENT THINKING, implement a 3-point scale to weight your ideas (3 is high) as you compare each against the criteria. If an idea rates very highly against a criterion, then multiply the idea weighting factor with the criterion weighting factor and post the sum in the appropriate column. The idea(s) with the highest sum(s) should be the most useful.

Rewrite the idea(s) you are going to implement below.

Acceptance Finding

You are now ready to develop your plan of action. To ensure successful implementation of your best idea(s), it is necessary to gain maximum acceptance. Remember, an idea has little value until it is put to use.

Consider the following--How should you alter or modify your idea so it will be as acceptable as possible to those it will affect and to those who will pass judgment on it? Ask yourself the following questions along with others that are relevant.

Whom will my idea affect?
How might I gain their acceptance?
What resources are needed to implement my idea?
How might I best develop a return on investment?
What major obstacles will I confront?
How might I overcome any obstacles?
What might go wrong?
Why would something go wrong?
What can I do to prevent problems?
What opportunities might present themselves?
How might I best gain support for my idea?
How might I best present and sell my proposal?
What should I not do?

Gaining Acceptance Using DIVERGENT THINKING skills, list all responses that come to mind by asking and answering the most important questions, based upon the stimuli provided above.

Use CONVERGENT THINKING skills to select the responses that you believe will ensure success.

Plan of Action Develop your plan of action and follow through. Remember, the proactive individual makes the right things happen on time.

Gather the best thoughts from your acceptance finding and develop your sequential plan of action. Establish start dates and target end dates. Decide who will be responsible for each task. Set out your check points to see if events are happening according to plan. Use the following page.

Action Plan

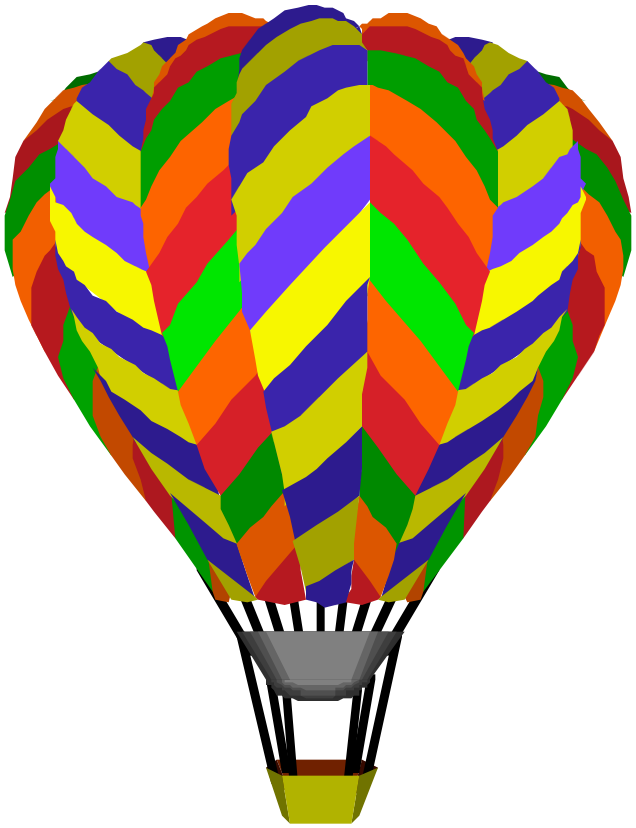
Tasks	Who	Start	End	Check Points

Summary and Conclusions

You have completed the Osborn-Parnes Creative Problem Solving Model. As you now know, this model is based upon generating many different ideas through brainstorming and deferred judgment--thus breaking habitual ways of thinking. Also, the ability to critically evaluate and assess the worth of ideas is important for selecting the most useful components of every problem. The key to using the Osborn-Parnes model successfully is to use the concepts of deferred judgment and critical judgment at the appropriate times.

The Osborn-Parnes model is presented as a multi-step linear approach to problem solving. It is designed to be fluid, and the steps can be used in any sequence. This basic model is the foundation for a variety of different creative problem solving processes.

With frequent practice, this model becomes easier to use and makes problem solving a fun experience. Using this model allows creative problem solving to become a way of thinking and living.



What is one half of eight?

Four -- I guess.
No more? No less?
But wait !!!
1/2 of 8 is 3, or E.
Tipped over it is m or w -- see?
To the Romans it still was VIII.

It's a bird in flight, the world,
the sun, a full moon at night; a
pair of skydivers holding hands.

It's a ball, a balloon, a raindrop,
a teardrop, a drop of dew; it's the
yolks of two eggs staring at you.

It's a wheel, a coaster, camera lens,
a soap bubble, a smoke ring ---
am I getting to you?

It's a plate or a saucer, even a ring;
half of eight is a tricky thing !!!

It's a Frisbee, a porthole, a circus ring,
a button, a marble, a pea or a seed.

Half of eight is wondrous indeed !!

But after I'd pondered, thought of it all,
1/2 of 8 was nothing at all --- Ooooo.

M. G. Nicholl
1-19-82
San Diego

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