### PSU Problem Solving Process

1. **Position**
   - Find, define and prioritize problems
2. **Sense**
3. **Uncover**
4. **Solve**
5. **Build**
6. **Achieve**

### Solve This Problem

Refine the Problem & Develop Alternative Solutions
## Encouraging Creativity

- **What is creativity?**
  - From Wikipedia — a mental process involving the generation of new ideas or concepts, or new associations between existing ideas or concepts.
- **Convergent versus divergent thinking:**
  - Convergence - narrowing our thinking about a problem or an issue.
  - Divergence – branching out and taking a broader perspective.

## What Prevents Creativity?

- **We seem to frown on it in education. Why?**
  - Because we judge you with testing, and encourage you to provide the *RIGHT* answer.
  - Not the most original, not the most creative answer, but the single right answer.
  - Business is often not that straightforward...
- **Being creative means:**
  - Taking risks, looking silly, and failing more often.
  - Our business culture doesn’t like failure.
- **The expert syndrome.**
  - Expertise is a prime commodity.
  - Expertise can cause tunnel vision.

## Causes of Mental Blocks

- Poor problem definition or ambiguous definition.
- Attacking the symptoms and not the problem.
- Assuming there is only one right answer.
- Getting “hooked” on the first solution that comes along.
- Getting “hooked” on a solution that almost works (but really doesn’t).
- Being distracted by irrelevant information, called “mental dazzle.”
- Getting frustrated by lack of success.
- Being too anxious to finish.

## Enhancing Creativity

- There are tons of techniques to help enhance creativity:
  - The techniques aren’t creative, you are!
  - But, they push you to a different starting point, help you make new associations (divergence), and help you take a fresh view.
  - Brainstorming is one approach.
- **Comments that reduce brainstorming to braindrizzling:**
  - That won’t work; that’s too radical; it’s not our job; we don’t have enough time; that’s too much hassle; it’s against our policy; we haven’t done it that way before; that’s too expensive; that’s not practical; we can’t solve this problem.
FOUR Commandments

I. The more ideas the better.
II. Build one idea upon another.
III. Wacky ideas are okay.
IV. Don’t evaluate ideas.

Print Ads

Special Promotions
Ground Rules

I. Strive for quantity of ideas, without special concern for quality.
II. Piggy-backing on another person’s ideas is okay, even encouraged.
III. Stress creativity by looking at a problem from another point-of-view.
IV. Don’t evaluate ideas.

Brainstorming Techniques

- Nominal Group
  - Start on paper
  - Share and build on ideas in group setting
  - Discuss and vote on the best ideas
- 6-3-5
  - Six people
  - Three minutes
  - Five ideas
  - Work off other ideas!
- Delphi Technique
  - Ideas submitted to group leader
  - Summarize and evaluate

Problems With Brainstorming

- Some research indicates that group interaction reduces ideation:
  - Large groups might inhibit some group members – try smaller groups.
  - “Production Blocking” – the tendency to take turns – might block good ideas while waiting through mediocre ideas.
    - Start with ideas on paper
    - Use electronic brainstorming
    - Stay on track with a good moderator
Other Useful Tools & Tricks

- Mental Maps
  - Use a white board or flip-pad
  - ID important factors and sub-factors

- Fishbone Diagrams
  - Problem, causal categories, specific possible causes
  - Understanding this causality can help generate solutions

Manufacturing Example

- Causal Loops
  - Identifies positive and negative relationships
More Approaches

- **ISSUE:** Incrementalizing when asked to come up with a new idea
  - Use the Gordon Technique – focus on the function, not the form.
  - Use Idea Checklists – ask questions about something we already have.
    - SCAMPER – Substitute?, Combine?, Adapt?, Modify?, Put to other uses?, Eliminate?, Reduce?

Creative Organizations

- Stable and secure internal environment
- Open channels of communication
- Encourage outside contacts
- Free idea units of other responsibilities
- Heterogeneous personnel policy
- Investment in basic research
- Decentralized and diversified
- Risk-taking culture
- Not run as a “tight-ship”

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