Four Tips for “Beefing Up” Your Problem-Solving Tool Box

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Introduction

Problems come in all sizes, shapes, and colors. There is no guaranteed step-by-step or “by the numbers” process for solving every problem we encounter. We must instead configure or adapt our problem solving processes to fit the problem at hand. As problem solvers, we have more in common with the cabinet-maker than with the assembly-line worker. What we need, then, are plans and blueprints, high-quality materials, a decent place to work, a well-stocked tool box, and the knowledge and skills necessary to properly select and use the tools in it. Toward that end, here are four tips for “beefing up” your problem solving toolbox.

1. Focus on clearly defining the solved state.
2. Be clear about all your goals and objectives.
3. Think of problem solving as a “cover-the-bases” activity.
4. Draw diagrams and otherwise picture the structure of the problem.

Tip #1: Focus on clearly defining the solved state

Pay at least as much attention to the solved state as you pay to the problem state. As Robert F. Mager’s fable of the sea horse reminds us, “If you’re not sure where you’re going, you’re liable to end up someplace else—and not even know it.”

When solving a problem, we typically wish to do more than simply rid ourselves of some unacceptable situation. More often than not we are trying also to achieve some other, more desirable state of affairs.

Conceptually speaking, we’re trying to move from the problem state (a) to the solved state (a’). We do so by traversing what is called “the solution path” (see Figure 1).

![Figure 1](image-url)
It seems obvious that if we do not focus some of our attention on the solved state, the likelihood of attaining it is diminished. Unfortunately, the problem state typically attracts all our attention. The squeaky problem state wheel gets the grease. On occasion, this is an appropriate response. If the roof is caving in, then discussions about where to go can wait until we’re safely outside.

But, if we’re not in an emergency situation and if we still have nothing more in mind than doing something to rid ourselves of the problem state, we can create situations where the solution to one problem creates one or more new problems. Solutions that create new problems are “inefficient” solutions. An “efficient” solution is one that creates no new problems.

Perhaps the best-known step in any problem solving process is the one most people think of as the first step: “Define the Problem.” This is probably the most misunderstood and poorly executed step in the process. For many people, “Define the Problem” means simply to provide a written statement of the problem. There is much more to it than that. To define means to establish boundaries, to encompass, to enclose, to locate, to isolate, to distinguish, to differentiate, to set apart. To define the problem state (or the solved state) means, at the very least, to do the following:

- To establish boundaries; to delineate (Locate).
- To give distinguishing characteristics; to differentiate (Isolate).
- To state the nature of; to describe precisely (Articulate).
- To state the meaning of; to provide a definition (Explicate).

Rarely are definitions of the problem state or the solved state crystal-clear up front. Clarity typically develops over time. In many cases, the definition of a problem may be considered complete only after the problem has been solved. Until then, it is a shifting, evolving, changing part of the process. Thus, although “Defining the Problem” is a good step with which to begin the problem solving process, it is only a starting point and it must be revisited on a regular basis. This also is true of any definition of the solved state.

There are several ways of focusing on the solved state. One is to define it the same way we would define the problem state. Another is to list possible measures or indicators of its attainment. Ask yourself questions like these: “How will I know the problem has been solved? What will I accept as evidence? What does the solved state look like?” Yet another way is to be clear about all the goals and objectives of the problem solving effort. (This last point is so important that it constitutes a tip all its own—the next one.)

**Tip#2: Be clear about all of your goals and objectives**

Ultimately, the aim of problem solving is action. To engage in problem solving is to search for a solution. A solution is a course of action that produces the solved state. To actually solve a problem is to implement the solution that has been found and demonstrate that it works. Solving problems requires intervention as well as investigation.

Intervening in complex organizations requires of us that (a) we are clear about all our goals and objectives and that (b) we carefully think through the likely effects of any actions we are contemplating.
Actions taken in an organizational context often “ripple” outward from the point of intervention, sometimes having unforeseen and unintended consequences. Our goals and objectives, therefore, are typically multi-dimensional; that is, we seek to eliminate some conditions, and to achieve others. There also are conditions we seek to preserve or avoid. (See Figure 2, the Goals Grid).

**Figure 2**

<table>
<thead>
<tr>
<th></th>
<th>I</th>
<th>II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do We Have It?</td>
<td>Achieve</td>
<td>Avoid</td>
</tr>
<tr>
<td>Yes</td>
<td>III</td>
<td>IV</td>
</tr>
<tr>
<td></td>
<td>Preserve</td>
<td>Eliminate</td>
</tr>
</tbody>
</table>

If we don’t want something that already exists, our goal is typically one of eliminating it. If we want something that doesn’t exist, our goal is ordinarily one of achieving it. Four categories of goals and objectives can be derived from the interplay of our perceptions and preferences: *Achieve, Preserve, Avoid*, and *Eliminate*.

For any problem situation, it is useful to ask the following questions as a way of clarifying all your goals and objectives:

- What are we trying to *achieve*?
- What are we trying to *preserve*?
- What are we trying to *avoid*?
- What are we trying to *eliminate*?

These same questions are also useful in examining any contemplated course of action. For example, if you’ve decided to solve the problems with a legacy accounts payable system by replacing it with a popular commercial version, you are well-served by asking the questions above in relation to that new accounts payable system.
Tip #3: Think of problem solving as a “cover-the-bases” activity

Information does not make itself available to suit the requirements of anyone’s problem solving process. Solving a problem in a complex organization has much in common with detective work. We are forced to follow leads and unearth clues. Further, it is generally the case in complex organizations that no one individual possesses all the information necessary to solve a given problem. Vital information appears in bits and pieces. We have different backgrounds, perceptual filters, and value priorities. Different people seek and assimilate information in different ways.

Consequently, if you listen carefully to almost any discussion of a problem in a group setting, what you’ll hear is conversation that shifts from problem to symptom to cause to solution and back again, often in no particular order. Such “bouncing around” is natural. Don’t worry about it. Above all else, don’t try to force yourself (or others) to follow some lock-step, linear process. The task of problem solving is very much a type of intelligence work, a matter of piecing things together.

A systematic approach is necessary but the point of having one is to make sure you tend to all the things that need tending to, that you “cover the bases,” not trot around them in a 1-2-3 fashion. Figure 3 depicts a set of 12 “bases” to be covered or tasks that typically need tending to in the course of solving a problem.

Figure 3.
Ordinarily, bases 4 and 5 are mutually exclusive; you do one or the other but not both. If you’re dealing with a problem where something has gone wrong, then your best bet, at least initially, is to focus on finding and fixing the cause of the problem. On the other hand, if you’re out to achieve some state of affairs never before attained, or if the cause of the problem has been found but can’t be corrected, then you’ll have to design and engineer a solution to the problem. In either case, you’ll have to settle on a course of action and carry it out.

**Tip #4: Draw pictures of the structure of the problem**

A picture or model of the elements and relationships in a problem situation will help you to more quickly and more completely grasp the situation and figure out what to do about it.

Consider, for example, the diagram shown in Figure 4. It depicts the structure of a general-purpose work system. The elements of this system include inputs, a processor, outputs, a controller, and two control loops. On the front end of this system is a task initiation loop and on the back end is an evaluation and termination loop (the dotted lines). The relationships among these elements are such that inputs to the work system interact with the processor. The interactions between inputs and processor, which typically consist of prefigured routines, are referred to as “processes.” These processes produce the work system’s outputs. All this occurs under the watchful eye of the controller.

![Figure 4](image_url)
If the outputs of the work system are faulty, several possibilities are suggested by the structure of the diagram in Figure 4. The inputs might be faulty. The processor or the controller might be malfunctioning. Perhaps one or the other or both of the control loops is open and no information is getting through. Whatever the contributing factors, the diagram provides guidance regarding places to look for what might be causing the problem and for what might have to be changed in order to solve it.

The use of diagrams or schematics as an aid to problem solving is not new. Technicians have been using schematics as troubleshooting aids for years. Computer programmers and systems analysts are familiar with, if not dependent on, flowcharts and data structure models. Industrial engineers have relied on process flow diagrams ever since the days of Frederick Winslow Taylor. Diagrams and schematics should be found in your problem solving toolbox too.

Most important, get in the habit of visualizing the problems you tackle.

More Information
This is an edited excerpt from a longer piece titled “Ten Tips for Beefing Up Your Problem Solving Tool Box” that appears on Fred Nickols’ articles web site (www.skullworks.com). Many other articles dealing with problem solving and additional workplace-related subjects can be found there as well. Fred can be contacted by e-mail at nickols@att.net.