Investigation & Intervention: The Two Phases of the Solution Engineering Process

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Solution Engineering

A problem exists when there is a gap or discrepancy between what you want and what you have, and what to do about it is not clear. Solutions to problems can be engineered (i.e., brought about through skillful, artful contrivance). To engineer a solution to a problem, you must figure out and carry out a course of action that closes the gap between what you want and what you have. The Solution Engineering Process presented here for your consideration and use consists of two interactive phases: Investigation and Intervention (see Figure 1).

The Investigation Phase: Unmasking the Problem					
Describe the Presenting Problem	Describe the Desired Results	Identify the Relevant Structure	Create A Map of that Structure	ID Points of Evaluation & Intervention	Map Out the Solution Path
The Intervention Phase: Executing the Solution					
Specify the Required Changes	Identify Methods & Resources	Obtain & Allocate Resources	Make the Required Changes	Monitor & Assess the Results	Adjust as Necessary

Figure 1 – The Two Phases of the Solution Engineering Process

The Investigation Phase: Unmasking the Problem

In the Investigation Phase you focus on clarifying or unmasking the problem and figuring out what to do about it. You begin by describing the presenting problem (e.g., wrong test scores were sent out). Next, you describe the desired results (e.g., corrected test scores are sent out). All problems are embedded in or part of some larger structure. So, the next step is for you to identify the structure in which the presenting problem is embedded, whether that structure is a process, a system, an organization, a factory, or a financial measure. In this case, the relevant structure is the scoring process. You study, analyze and then create a visual map of that structure. You examine the map to pinpoint the places where results will be assessed (i.e., where in the scoring process the correctness of scores can be determined). These are known as *Points of Evaluation*, and there might be more than one of them. A related task is to identify places in the structure where there are things you can change that will affect the desired results (i.e., the things that must be changed to achieve correct scores). These are known as *Points of Intervention*. The last step in the Investigation Phase is for you to map out the Solution Path,

that is, trace out how changes made at the Points of Intervention will ripple through the structure of the situation, ultimately impacting the Points of Evaluation (e.g., how the changes made in the scoring process will ensure correct scores).

The Intervention Phase: Executing the Solution

In the Intervention Phase you focus on doing what you have figured out. To intervene is to change things with some outcome or purpose in mind. Your purpose in the Intervention Phase is to achieve the results that define the "solved state." You begin the Intervention Phase by specifying the changes that will be made at the *Points of Intervention*. What will be changed? In what ways? How? By whom? When? With the required changes in mind your next step is to identify the resources required and the methods that will be used to carry out the changes. You obtain and allocate these resources and you make the changes using the methods you identified. You monitor and assess the effects of the changes and make any necessary adjustments. These adjustments can include revisions to conclusions and plans you made during the Investigation Phase. Be particularly alert for new issues arising from the changes you're making.

Recap

All problems you encounter are embedded in or part of some kind of larger structure. All solutions require you to modify one or more aspects of this structure. You must carefully examine the structure in order to identify (1) Points of Evaluation, (2) Points of Intervention and (3) paths connecting the two. Mapping the structure of the situation enables you to configure a course of action commonly called "a solution." Once you have configured a course of action or solution, you must carry it out. This entails marshaling support and resources as well as managing the actual change effort. Your aim is to (1) make changes at the Points of Intervention, (2) have the effects of these changes ripple through the structure of the situation altering circumstances at the Points of Evaluation, and (3) to have these altered circumstances be those that define desired results or what might be termed "the solved state."

Further Reading about Solution Engineering

You can access the papers listed below by clicking on the title.

1. Choosing the Right Problem-Solving Approach
2. Five Kinds of Gaps and What to Do About Them
3. Forget about Causes, Focus on Solutions
4. Reengineering the Problem-Solving Process
5. Solution Engineering: An Introduction
6. Solution Engineering in Action: A Really Good Example
7. Ten Tips for Beefing Up Your Problem-Solving Toolbox
8. Three Cases of Figuring Out What to Do
9. What's Your Intervention Logic? – The Links to the Bottom Line

More Information

You can contact me, Fred Nickols, by e-mail at fred@nickols.us and visit my articles web site at www.nickols.us. There, you will find much more information about problem solving and Solution Engineering.