

# The General Form of the Solution

## Search Activity is Guided by “The General Form of the Solution”

Problem solving has often been referred to as a “search” activity. But, search where and for what?

It strikes me as very important for problem solvers to be very clear about what they are searching for. I think that’s where a notion I call “The General Form of the Solution” comes into play. The statements below capture the focal point of the search activity in numerous problems I’ve solved over the years. In all cases, I knew – in general – what I was looking for. The specifics emerged during the course of the search. Many were accompanied by an “Aha! Moment.”

### The Load Rate Problem

The search was initially a search for ways of reducing load rate and charges to programs, and then morphed into a search for a way of reducing space occupied which meant finding ways of reducing the space requirements for a particular operation. (Aha! Realizing that the operation in question used tub files which required a lot of horizontal space and the solution would take the form of vertical filing systems.)

### The Extended Range Problem

The search was initially for an explanation as to why my ship’s guns were delivering effective gunfire at a range well beyond their supposed maximum range. That led me to discover an error in the range tables on which the design of the system controlling the guns was based. It then shifted to a search for ways of making use of that extended range. (Aha! Closing the Range Table book and noticing that it indicated 2500 FS when the guns were 2650 FS, which meant the system design was flawed.)

### The Test Center Staffing Problem

The search was for a method (an algorithm) test center supervisors could use to make the most efficient (i.e., least costly) test center staffing decisions for any test administration. (Aha! Reviewing some test items, one of which had to do with filling up some glasses of various sizes from a pitcher so as to cross the minimum number of lines on the glasses and realizing that was same as the test center staffing problem only in different form.)

### The Productivity through Training Problem

The search was initially for ways of improving the productivity of Financial Aid Assistants in ETS’s FAF processing operation. The client had been told I could develop training that would improve productivity. The search was guided by two basic productivity principles: (1) Don’t do it at all if you don’t have to, and (2) If you have to do it, do it once and be done with it. (Aha! Asking one of the employees why he kept referring to a three-ring binder and discovering he was manually rerunning the computer edits to determine why the FAF in question had been suspended from processing. A minor computer coding change eliminated that requirement.)

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## The FAF Correspondence Unit

The search was for ideas to improve the functioning of the customer inquiry correspondence unit where the work entailed responding to written customer inquiries. (Aha! Don't improve it, shut it down. Instead of writing a response, send the customer a postcard with an 800 number on it and have them call the telephone inquiry unit.)

## The Reject Rate Problem

The search was for the causes of such a high reject rate and actions that would reduce it. (Aha! One was finding that the organization of the code list was inappropriate and the other was finding that the registrants were not given adequate instructions about filling out the registration form.)

## The New Business versus Performance to Budget Problem

The search was for an explanation of why department heads stayed focused on performance to budget instead of focusing on acquiring new business as their VP claimed he wanted them to do. (Aha! An analysis of several months of the department head's memos to his department heads revealed they all focused on performance to budget.)

## The Plain Language Problem

Programming a new PC-based system to support a new financial product was proving extremely difficult. Many of the product specifications were written in actuarial notation. The search was for a way of reducing the difficulty actuarial specifications presented the programmers who were trying to code them. (Aha! When I checked with an actuary to see if the specifications could be expressed in ordinary math terms, I found they could and subsequently they were.)

## The Calling in Sick Problem

The search was for an explanation about a puzzling pattern of a star sales rep calling in sick in the middle of a hot selling streak. (Aha! The other reps finally filled me in. The rep in question was using the payment of sick time (based on average sales) to offset a slow previous week.)

## The Database Scrub Problem

The search was for a faster and less expensive way of cleaning up or "scrubbing" a large database that was being moved from a flat file structure to a relational database structure than what the mainframe IT shop proposed. (Aha! The database was downloaded to PCs and the work was done there.)

## The Female Computer Programmer Problem

The search was for an explanation of a situation involving a female programmer who was being criticized by her peers for "taking too long" to code her programs. (Aha! Recognizing that her time to compile was longer than her colleagues were taking but her programs usually compiled on the first try. Her colleagues' program didn't. They were using very expensive compiler time

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to debug their programs. Her overall time was consistent with the time her colleagues were taking and, owing to less compiler time, her programs were much less expensive.)

## The 90-Day Wonders Problem (a.k.a. 30 + 30 + 30)

The search was for a way of tripling a workforce of system specialists in a 90-day timeframe. (Aha! Realizing that we could use a buddy system and have them train each other. Thirty in-place system specialists trained 30 new hires in 30 days and the 30 newly trained specialists then trained 30 more new-hires.)

## Incidental Productivity Improvement

While developing algorithm-based training for traveler's checks claims examiners, we were asked to keep our eyes open for any ways in which claims examiner productivity could be improved beyond that expected from the algorithms and the training. The search was for ways in which the time of the examiners was being wasted. Some samplings of time away from their workstation revealed they were spending roughly 25 percent of their time standing in line at their supervisor's desk to obtain approval for their proposed resolution of a claim and at the newly-installed large copy machine that had replaced several smaller ones scattered about the work area. The small copy machines were in a storeroom. No proposed claim had ever been rejected by a supervisor. (Aha! Increase the dollar amount of the claims examiners could resolve on their own and put the small copy machines back out in the work area.)

## Putting Supervisors on an Equal Footing with Union Reps

Construction supervisors were simply not as knowledgeable about the terms of the industry contract as the union reps and would regularly lose out in disputes with union reps. The search was for a way of equipping the supervisors to better understand and refer to the contract as documented in their hip-pocket copy of the contract book. (Aha! A training program was developed that required them to refer to their copy of the contract book to answer questions. That exercise familiarized them with the terms of the contract and the organization of the contract book, and they were then on equal footing with the union reps.)