DISTANCE CONSULTING LLC

Solution Paths

Getting from Here to There

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"Assistance at A Distance"

The three sections making up this paper will appear as columns in ISPI's PerformanceXpress in November and December of 2015 and January of 2016.

Solution Paths: Getting from Here to There

Section I: Some Background

It is well and truly said that "We stand on the shoulders of giants." All that we achieve or accomplish is built on a foundation laid by those who have gone before us. Nowhere is this truer than in my own case and I would like to begin this paper by acknowledging two sets of giants to whom I owe a great deal – and to whom this paper owes a great deal.

First come Allen Newell and Herbert A. Simon. The focal point of this paper is the concept of "Solution Paths." I acquired that concept from Newell and Simon's 1972 book, *Human Problem Solving*. I am also indebted to them for some of the more basic formulations related to problem solving on which I rely. Three examples are listed below.

- "A person is confronted with a *problem* when he wants something and does not know immediately what series of actions he can perform to get it" (p. 72).
- "Speaking in general terms, problem solving is concerned with finding paths from initial states to desired states" (p.828).
- "Most often . . . the search for a solution path operates either by working forward from the initial object toward the desired object or by working backward from the desired object toward the initial object" (p.100).

The second set of giants consists of David G. Bowers and his coauthors Jerome L. Franklin and Patricia A. Pecorella. In the early 1970s, when I was still in the Navy and being trained as an internal OD consultant, I came across a paper by Bowers and his coauthors (1973) in which was set forth a principle that I immediately adopted and that still guides my practice today. They wrote, ". . . responsible change practice requires that one must be able to say that a particular treatment produces the condition it is intended to produce (p.20)." In other words, actions must be linked to outcomes. I am also indebted to Bowers *et al* for the notion that change is indirect or, as they wrote, "…one never changes 'it' (the condition which one proposes ultimately to affect); instead, one changes things presumed to lead to 'it' (p.20).

Because my aim here is to examine "solution paths" as a way of linking actions to outcomes, thus ensuring that performance meets expectations and that our efforts to improve it are consistent with the principle of "responsible practice," let's begin by reviewing some basics about performance and then move on to some basics about solution paths.

Some Performance Basics

To perform (in the workplace sense of that word) is to act in ways that achieve a specified result or outcome. Together, our actions and the outcomes they produce define our performance. With respect to our performance, being able to link our actions to the outcomes

we seek is the fundamental task facing us all. Unfortunately, actions are all too often disconnected from outcomes; people are very busy but accomplishing very little.

The outcomes we seek typically take the form of intended and intentional changes in the value of some workplace variable (e.g., reductions in error rates, waste levels, reject rates, cost-per-unit, or increases in retention levels, profits or even something as grand as earnings-per-share). Our performance goals indicate two things: (1) the variable that we have targeted and (2) the change in its value that we seek.

The workplace variables we seek to affect do not exist in isolation; they are embedded in a larger network of other variables, some of which we can affect through direct, immediate action and some of which we cannot. Oftentimes, the value of the variable we seek to affect cannot be altered by direct, immediate action. To affect the value of the variable we have targeted generally requires us to change some other variable in that network of variables. In a word, as Bowers *et al* noted, change is *indirect*. We change something "over here" in order to realize a change "over there." The effects of our actions then ripple through the structure of that network of variables, making their way from the place where we intervene to the place where our targeted variable is located. Thus it is that a solution path takes us from here to there.

Solution Paths

Knowledge workers, regardless of their particular profession or occupation, regularly intervene in the situations in which they find themselves; they change things with some purpose or outcome in mind. Successful intervention requires linking actions to outcomes.

Change, as noted, is typically indirect; you change something "over here" in order to realize some other change "over there." For all this to happen in any kind of systematic, reliable way, our points of intervention and our points of impact must be connected, there has to be a path – a solution path – leading from here to there.

Solution paths are at the core of our intervention logic, the reasoning and rationale that justifies our actions, a logic that says "Doing *this* will lead to *that*" or, conversely, "If you want *this* you must do *that*." Identifying solution paths is the essence of Solution Engineering, a process for identifying courses of action that lead to desired outcomes. (See Figure 1 for a visual depiction of the concept of Solution Path.)

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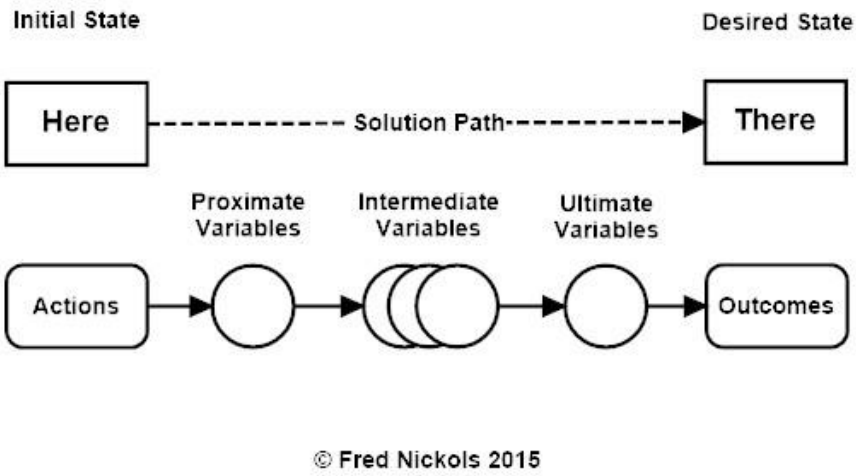

Figure 1 – The Concept of Solution Path

The places where we can take direct, immediate action (*Here*) and the places where we want to see certain outcomes (*There*) are both embedded in the structure of the situations in which we intervene. They are connected by links and relationships to other variables in that same structure.

Three categories of variables are of primary interest: proximate, intermediate and ultimate.

1. *Proximate* variables are those whose values we can change via direct, immediate action.
2. *Ultimate* variables are those variables whose intended values form our end targets but are not available to us via direct, immediate action.
3. *Intermediate* variables are the variables that link proximate variables with ultimate variables.

These variables, linked to our actions on one end with proximate variables and linked to the outcomes we seek on the other end by ultimate variables, make up the solution path linking *Here* with *There* (see Figure 1). In the course of identifying a solution path for realizing this or that outcome three different kinds of structures or arrangements of variables are often encountered: (1) mathematical, (2) operational and (3) behavioral. Collectively, these three define what I call the "performance architecture" of the organization. It is in that structure or architecture that solution paths are to be found.

- *Mathematical structures* are found in commonplace financial measures such as profit, Return-on-Equity and Earnings-per-Share. Other, non-financial, mathematical measures exist as well; for example, reject rates, error rates, and retention rates to name just

three. Tree charts are eminently suited to visualizing, depicting and analyzing the structure of mathematical measures.

- *Operational structures* are found in other aspects of the organization; for example, in processes, tasks, procedures and, of course, operations. These are generally concerned with structured, organized activity and are often depicted in flowcharts, block diagrams and "swim lanes."
- *Behavioral structures* have to do with human behavior and involve factors such as goals, actions, perceptions, feedback, motivation, complicating conditions and the exercise of control. Here a model of human behavior and performance proves useful.

A solution path can often lead from any one of these kinds of structures to one or more of the others (e.g., from a desired bottom-line financial result through particular operational processes to necessary changes in human performance or, in the other direction, from changes in human performance through particular processes to a defined, bottom-line impact). Tracing out these paths is the key to being able to identify a viable solution path and to being able to say that *this* action will produce *that* result or that *this* result requires *that* action.

In the next two sections I will present and discuss two solution paths, both drawn from my experiences as a member of a large testing organization. One was devised when I was a consultant on staff, the other when I was the director of an operating division. One path travels from an operational problem to the actions taken in resolving it; the other path travels from a problematic financial measure to the actions involved in improving it.

Section II: An Example

I was asked to look into an operational problem in a division at a testing company where I was employed as a consultant on staff. The division director indicated the reject rate in a particular process was too high and he wanted me to see what could be done to get it lower.

The operation in question processed registration forms for a certification testing program and about 60-70 percent of the forms were being rejected because they failed computer edits that were related to missing or incorrect information on the form, including invalid institutional codes.

The errors on about half of the rejected registration forms could be resolved by staff but the other half of the forms had to be returned to the people who submitted them. Resolving simple errors and reentering the forms into processing constituted extra work and was an unnecessary cost. Rejected forms also meant that the registrant would likely not take the test when planned and this resulted in complaints from the registrants and the testing program's sponsors.

Solution Paths: Getting from Here to There

The starting point for this effort was the reject rate, the ratio of rejected forms to total forms processed. Clearly, to improve matters the number of forms containing errors had to be reduced. Because the information on the form was provided by the registrants, lowering the reject rate meant reducing the errors made by registrants. Registrant behavior in filling out the registration form was yet another variable.

At this point, the structural model of interest is one of behavior and performance. I use the GAP-ACT Model, shown in Figure 2, to help identify the factors that would have to exist in order for desired performance to occur. The model led to some basic questions enumerated below.

- *Goals*. Do the registrants want to fill out the form in a way that satisfies the testing program's requirements? Are they aware of the consequences and costs to them if they don't?
- *Perceptions*. How would the registrants know if they had filled out the form correctly? Are they aware of the testing company's requirements?
- *Conditions*. Is there anything that interferes with the registrants filling out the form properly, in particular, the institutional code? Where do they get that code?

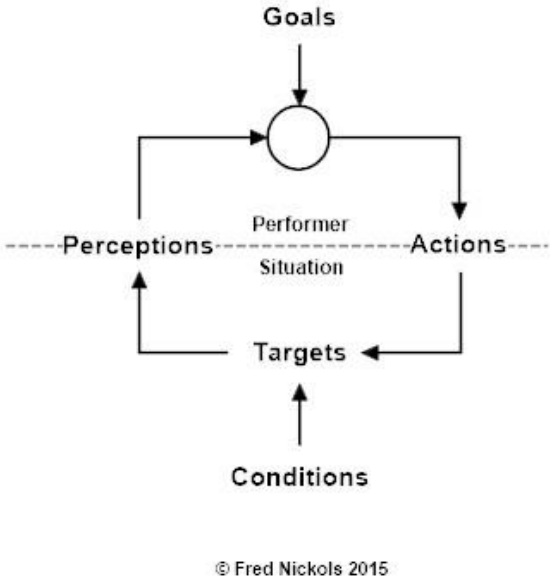

Figure 2 – GAP-ACT Model

The registrants were trying to register to take a certification test. A passing score was required to become certified and certification was a pre-condition for employment. Submitting a flawed registration form delayed taking the test, getting certified and obtaining employment, all of which delayed income. A failed registration attempt had negative financial consequences. If the registrants knew this they should be motivated to fill out the registration form properly.

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The registrants obtained the registration form from a test bulletin sent out by the testing company. Presumably, the bulletin explained how to fill out the form properly and explained the consequences of failing to do so in a correct and complete manner. As it turns out the bulletin instructions for filling out the form were minimal. Not all requirements were spelled out and nowhere were the registrants advised of the consequences to them of failure to fill it out properly.

The registrants obtained the institutional codes from a list provided by the testing company. The list was organized numerically, to aid the processing staff in identifying the institution associated with a particular code. However, the registrants had the name of the institution and were trying to obtain its code. The registrants needed a code list that was organized alphabetically.

In this case, the solution path ran from the bulletin and code list to the registrants and, through them, to the registration form. It was the performance of the registrants in filling out the form that was at the heart of this issue. I could not directly act on the reject rate, on the errors, or on the registrant's behavior; nor could I directly change the test bulletin or the code list. However, I could explain the problem to the testing program's management and persuade them to undertake an effort to revise the bulletin and code list and, through those changes, affect the registrants' ability and motivation to fill out the form correctly and thus reduce the errors they were making. The payoffs to program management would take the form of reduced processing costs and fewer complaints from test takers.

The target variable – the errors driving the reject rate – and the influencing variables are shown in Figure 3 below. It depicts the solution path that was identified for reducing errors on the registration form.

Solution Paths: Getting from Here to There

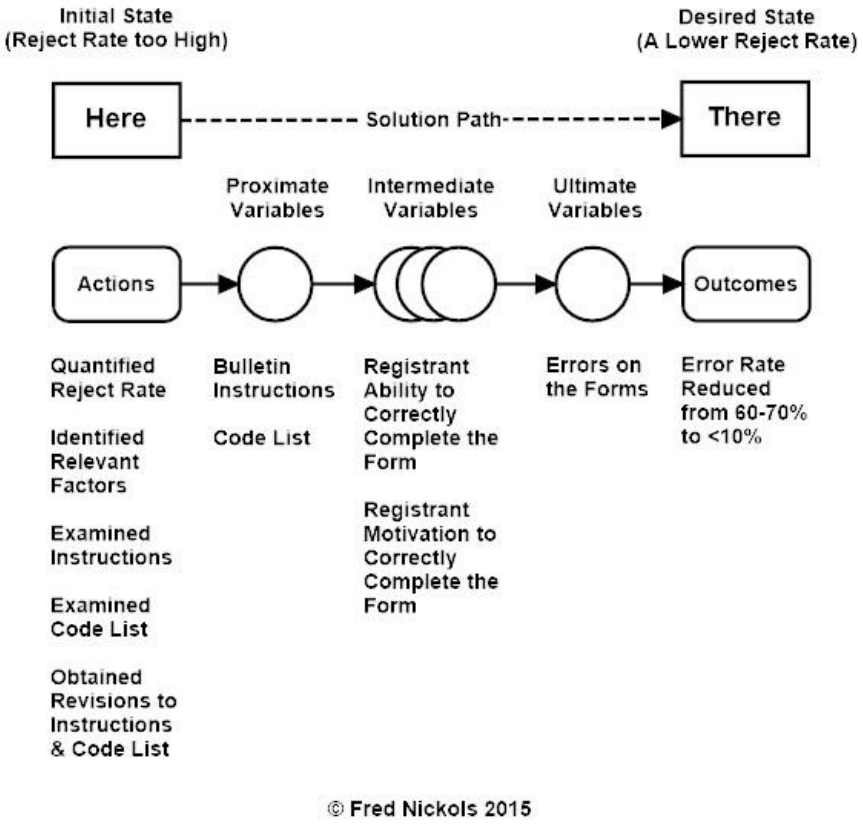

Figure 3 - The Solution Path for the Reject Rate Problem

Two key actions were taken: (1) the instructions in the bulletin were re-written and expanded, to include an example of a properly completed registration form as well as information advising the registrants of the consequences to them of failure to properly fill out the form and (2) an alphabetically organized code list was developed and provided. Errors on the registration form plummeted and rejects dropped from 60-70 percent to less than 10 percent. Registrant complaints were significantly reduced and, because the amount of time operational staff members spent in error resolution was greatly decreased, some staff members were reassigned to other areas in need of support. Needless to say, charges to the testing program were reduced and registrant and sponsor complaints practically disappeared.

Commentary

Did I prepare a hard copy of the diagram above to guide my effort to resolve the error rate problem? No. But the GAP-ACT model shown in Figure 2 did indeed guide my effort. I had that model in mind as a mental model of the variables in the situation facing me. I worked backward from the error rate to errors on the form to the registrants as the performers in question, whereupon I looked into how they would acquire the ability to fill out the form correctly and where they obtained the institutional codes. In turn, that led me to examine the

instructions in the test bulletin and the code list. At that point, the necessary actions were obvious. With the solution in view, I worked to influence program management to make the necessary changes to the bulletin and the code list. In short, I used the GAP-ACT Model to figure out the solution path depicted in Figure 3.

As I indicated in Section I, finding a solution path entails examining the structure of the situation and three basic kinds of structures are often involved: Mathematical, Operational and Behavioral. In this case, the mathematical model was simple enough: the ratio of forms with errors to forms received. The operational model was also straightforward: forms came in, were scanned and edited and those with errors were rejected. The primary structure of interest consisted of the variables that affected the behavior of the registrants. To solve the reject rate problem entailed getting the registrants to do a much better job of filling out the registration form and that involved (1) enabling them to fill out the form properly, (2) informing them of the consequences of failure to do so, and (3) removing an obstacle that prevented them from doing so.

In the next section we'll look at another solution path, one that ties to a financial measure on one end and to some changes in physical arrangements of the workplace on the other end.

Section III: The Load Rate Example

Shortly after I took over an operating division in the testing company where I was employed, we, along with several other parts of the company, moved from very inexpensive space to much larger and more expensive space. Naturally, space charges went up. My division's clients (the managers of various testing programs), began wanting to know what I was going to do about "the load rate." I wasn't quite sure what that was all about so I had a young fellow in my division – a veritable financial wizard – develop a map or diagram of the load rate measure. See Figure 4 below.

Solution Paths: Getting from Here to There

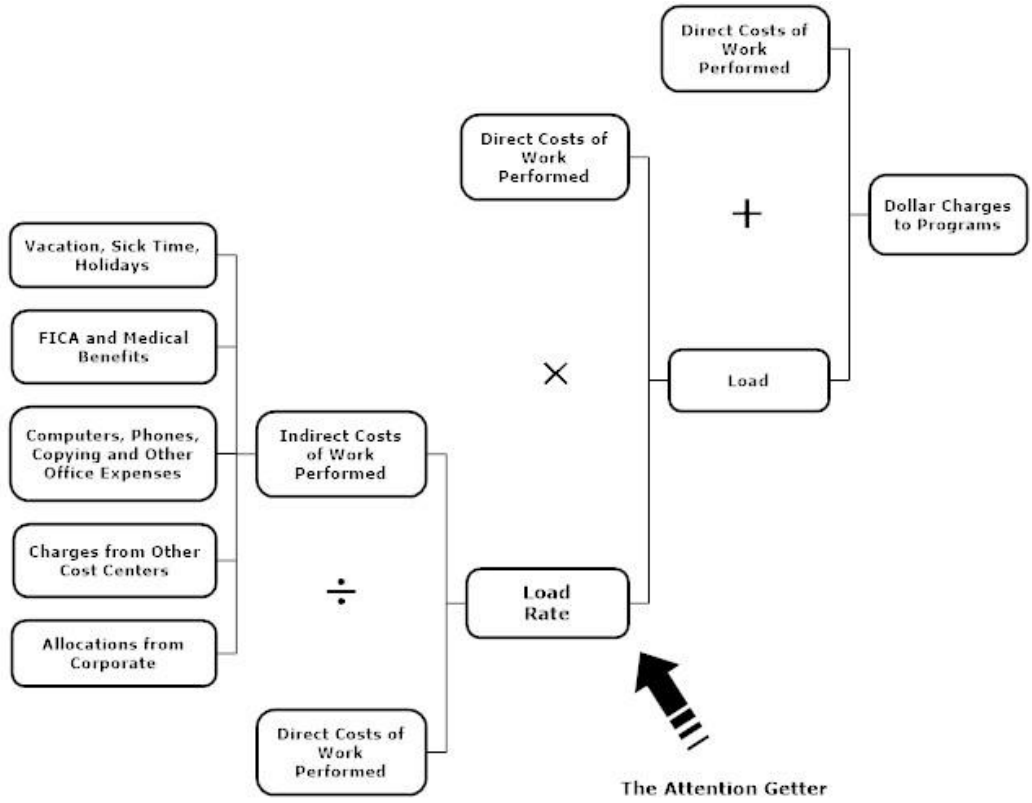

Figure 4 - The Structure of Load Rate

Armed with this map of Load Rate, I began digging deeper. Obviously, our space charges had gone up. This was reflected in our indirect costs of work. However, we had also been allocated significantly more space, further increasing the indirect costs of work. In addition, the allocations from corporate had been increased because there was considerable unused space in the new facility and the costs of unused space were distributed across all cost centers. The long and the short of it was that the indirect costs of work performed had gone up quite a bit while direct costs (essentially the wages paid to people for the work they performed) had remained about the same.

As the diagram in Figure 4 reveals, the increase in indirect costs drove up the load rate and that drove up load and charges to the programs. And so I set off on a search for a solution, a path whereby actions I might take would drive load rate back down. It was obvious from the outset that increased space, increased space charges and increased allocations from corporate were the culprits. Naturally, I focused on our division's space utilization.

In the new facility we occupied 21,000 square feet; 16,000 in one building and another 5,000 in the building next to it. We had some extra space in our main facility. If I could find a way to fold the additional 5,000 square feet into the main facility I could get rid of roughly 25% of the

indirect charges and lower load rate by an appreciable amount. That led to an examination of the utilization of the 5,000 square feet in the adjoining building.

The 5,000 square-foot space wasn't entirely used either and what was used was taken up in large measure by boxes of files on table tops which were spread out all over the space. It was clear they wouldn't fit in the main space but if I could find a suitable vertical filing system, I could make room for this operation in the main space. We found such a filing system and after working through the details with the work group and with the VP of Operations, the new filing system was acquired, the operation was folded into the main space and load rate was taken down by an amount that seems to satisfy the division's clients. (They, too had moved into the new facility and were facing similar challenges.)

The Solution Path for the Load Rate problem is shown in Figure 5.

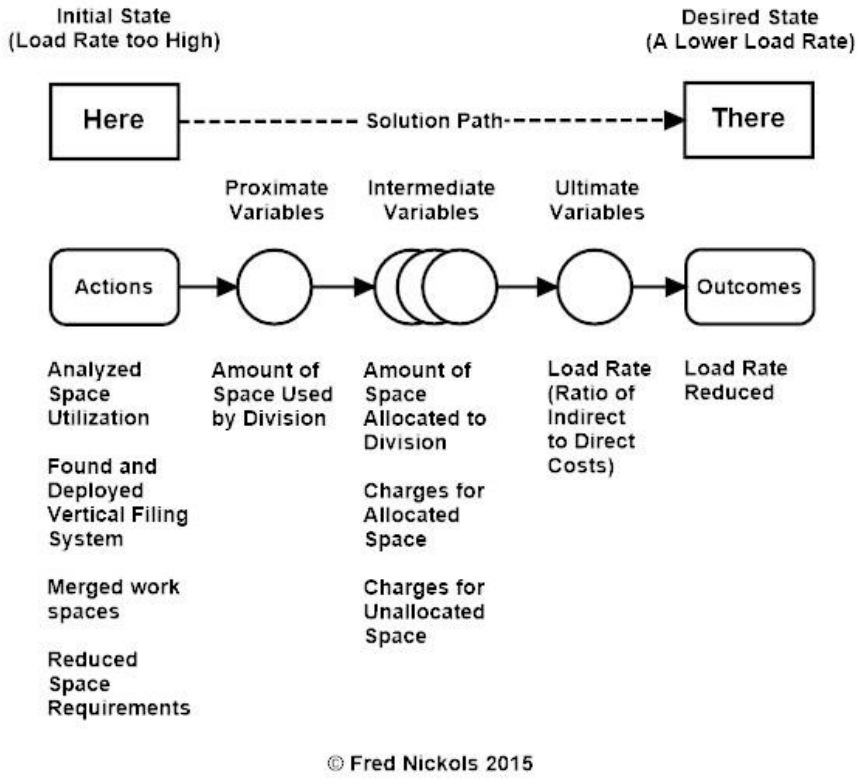

Figure 5 – The Load Rate Solution Path

As you can see, the solution path in this case ran from my actions to a reduction in the space used and reduced charges for it to a reduction in indirect costs, ending in a reduced load rate.

The structure in which all this occurred consisted of certain aspects of the organization's financial accounting and measurement system whereas the structure involved in the solution

path for the reject rate problem started with an operational measure but quickly moved to one that involved factors affecting human behavior. Yet, both solution paths are marked by an initial state, a desired state, an intended outcome, direct immediate actions and proximate, intermediate and ultimate variables linking actions to outcomes. And, in both cases, models or diagrams of the relevant structures and their component variables enabled finding a viable solution path.

The End

This ends my foray through the topic of solution paths. I hope you found it informative and helpful and I also hope you give the ideas presented here a try the next time you find yourself searching for a solution path that will link your actions to the outcomes you seek, enabling you to get from *Here* to *There*.

References

1. Bowers, D.G., J.L. Franklin, P.A. Pecorella. *A Taxonomy of Intervention: The Science of Organization Development.* Technical Report Prepared for Office of Naval Research. Distributed by National Technical Information Systems (NTIS), U. S. Department of Commerce. May, 1973. Available at www.dtic.mil/dtic/tr/fulltext/u2/762085.pdf
2. Newell, A., and H.A. Simon (1972). *Human Problem Solving*. Prentice-Hall: Englewood Cliffs, NJ.