

# Knowledge Worker

## Solution Paths: Getting from Here to There

(November 2015)

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### Looking Back

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 column by acknowledging two sets of giants to whom I owe a great deal – and to whom this column owes a great deal.

First come Allen Newell and Herbert A. Simon. The focal point of this column (and the next two) 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

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facing us all. All too often actions are disconnected from outcomes; people can be very busy but accomplishing very little.

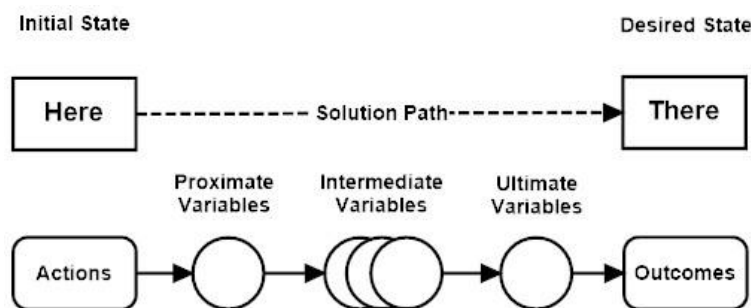
The outcomes we seek typically take the form of intended and intentional changes in the value of some workplace variable (e.g., reductions in error rates, waste levels, reject rates, cost-per-unit, or increases in retention levels, profits or even something as grand as earnings-per-share). Our performance goals indicate (1) the variable 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 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. . (See Figure 1 below for a visual depiction of the concept of Solution Path.)



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Figure 1 – The Concept of Solution Path

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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*.” Uncovering solution paths is the essence of Solution Engineering, a process for identifying courses of action that lead to desired outcomes

The places where we can take direct, immediate action and the places where we want to see certain outcomes 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.

NOTE: Since I first wrote and published this column, I have revised my thinking to include a fourth category of variable: *Penultimate*. Penultimate variables are those that are directly connected to the Ultimate variable. I have also begun to refer to a “Solution Path” as an “Achievement Path.”

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 A with A' (see Figure 1). In the course of uncovering 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.

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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 those paths is the key to being able to identify a viable solution path and being able to say that this action will produce that result or that this result requires that action.

### Looking Forward

In the next two columns 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 travels from an operational problem to the actions taken in resolving it; the other travels from a problematic financial measure to the actions involved in improving it.

### References

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### About the Author

Fred Nickols, CPT, is a knowledge worker, writer, consultant, and former executive who spent 20 years in the U.S. Navy, retiring as a decorated chief petty officer. In the private sector, he worked as a consultant and then held executive positions with two former clients. Currently, Fred is the manager partner of [Distance Consulting LLC](#). His website is home to the award-winning [Knowledge Worker's Tool Room](#) and more than 200 free articles, book chapters, and papers. Fred is a longtime member of ISPI and writes this monthly column for *PerformanceXpress*. A complete listing of all Knowledge Worker columns and access to them is available [here](#).