Solution Engineering

Glossary of Terms

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This glossary provides clarification regarding some of the terms and phrases used in the Solution Engineering and Business Problem Solving articles on my web site. The glossary makes interesting reading in its own right.

Glossary of Terms Used in Solution Engineering

Term	Definition
Accessible Variables	Those variables in the structure of the situations that can be affected through direct, immediate action. Also known as Proximate Variables.
Actions	The activities of people, equipment and other things capable of affecting their environment.
Analysis	The breaking down of a physical or logical entity into its constituent elements, connections, and relationships – taking things apart.
Business Problem	A situation in a business or organization that requires action but for which the necessary action is not known.
Cause	Some factor or set of factors that combine in such a way as to produce the problem state. The most common usage of "cause" refers to a change of some kind, usually an unwanted or unanticipated change, one that results in a previously acceptable situation becoming unacceptable.
Change Targets	Those elements, connections, and relationships in the structure of the situation in which the problem is embedded that have been selected for change as a way of realizing the solved state.
Change Goals	The nature of the changes to be made to the change targets (e.g., increase profit, reduce costs, reduce rework, etc.).
Connecting Variables	Variables that connect the Accessible or Proximate variables with the Driver Variables and thence the Target or Ultimate Variable. Also known as "Intermediate Variables."
Data Collection	The gathering of specific information, the nature of which has been specified in advance (see Investigation).
Data "Round-Up"	The indiscriminate gathering of all kinds of information in the hope of finding something useful.
Define the Problem	The word "define" has several meanings. All apply to the task of defining a problem: - establish boundaries (isolate or locate) - enumerate characteristics (differentiate) - describe the extent and nature of (articulate) - describe the meaning of (explicate)

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Diagnosis	The process of comparing an observed condition against a standard for some further purpose. Comparisons might be performed to identify variances, determine the contributing factors or corrective action, or simply to classify observed phenomena, mainly symptoms. Ordinarily, diagnosis refers to figuring out what is wrong and what to do about it. Diagnosis and analysis are often used interchangeably but they are not the same.
Disconnect	The disruption of connections between solutions and the problems they are intended to solve. **Note**: *Theoretically, this is the result of a misalignment between the problem space and the search space. Practically speaking, it happens when one person defines the problem, another person diagnoses it, and yet a third implements the solution. (Disconnects can occur in the vertical and horizontal dimensions).*
Discrepancy	The difference between what you have and what you want, between *what is actually the case* and *what should be the case.* Essentially, this is the difference between the problem state and the solved state, sometimes referred to as a "gap" in results.
Disturbance	Something affecting the target variable independently of any actions you take or might take.
Domain Disconnect	A break in the connections between a problem and its solution that occurs when a problem is in one department or functional area of the organization, the solution appears to be in another, and the problem solver lacks the authority to investigate or intervene in both functional areas.
Driver Variables	Those variables that directly affect the Target Variable. Also known as Penultimate Variables.
Engineer	There are two primary meanings of engineer as a verb. One is to arrange or bring about through skillful or artful contrivance. The other is to apply scientific and technical knowledge to practical problems.
Frame of Reference	Our worldview; the way we perceive, analyze, and interpret events. Our frame of reference includes our language, our models, our theories, and our concepts. It's our knowledge base colored by our values and our upbringing. In short, it's the filter through which we see things.
Gap	A difference between what is and should be, between actual or current conditions and required or desired conditions. Synonymous with discrepancy as defined above.

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Goal State	Some desired or required condition. Synonymous with the reference state for a target variable.
Goals Grid	A 2x2 matrix formed by the interplay of Yes and No answers to two questions about a particular condition or circumstance: 1. Do we have it? 2. Do we want it? The Yes/No answers to these questions serve to identify four types of goals: achieve, preserve, avoid and eliminate.
Horizontal Disconnect	The disruption of connection between solution and problem that typically occurs when a problem is defined in one department, analyzed in another, and addressed in yet a third. Information systems development projects offer many instances of horizontal disconnects, as do new product development and roll out efforts.
Implementation	The act of carrying out a plan of action in accordance with predetermined schedules and assignments. Implementation is always planned and always deliberate.
Intermediate Results	Results between proximate and ultimate results.
Intermediate Variables	Variables that link Proximate or Accessible variables with Penultimate or Driver Variables.
Intervention	Changing one or more aspects of a situation with a specific purpose or outcome in mind. Intervention may be planned or unplanned but is always deliberate – there is always some end in view.
Investigation	The pursuit of information in a manner typified by detective or intelligence work; that is, going where the information leads. This does not preclude collecting data in accordance with some predetermined scheme or prefigured set of requirements (see Data Collection).
Mess	A set of related but as yet undifferentiated problems. By definition, a mess is amenable to analysis, that is, the set of problems can be sorted out or differentiated from one another.
Model	A means of representing the structure of the situation in which the problem is embedded, typically in diagram form (e.g., flowcharts, tree charts, cause-and-effect or Ishikawa diagrams, process maps, and schematics).
Operand	That which you seek to affect. Synonymous with change targets.
Operators	The means used to change operands or change targets.

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Opportunity	A gap between what is and what should be and for which an appropriate action is known.
Penultimate Variables	Those variables that directly affect the Target or Ultimate Variable. Also known as Driver Variables.
Performance Architecture	That structure of elements, connections and relationships making up the situation in which desired results are to be realized and in which interventions must be made in order to realize them.
Point(s) of Evaluation	The place or places in the structure of the situation where the effects of the solution will be measured.
Point(s) of Intervention	The place or places in the structure of the situation at which changes can be made and from which any changes made will propagate or "ripple through" the structure of the situation.
Presenting Problem	The situation or circumstances or conditions that indicate or suggest the presence or existence of a problem.
Problem	The difficulty, perplexity, and uncertainty experienced when a person is confronted by a situation requiring action (typically because of a gap between what is and what should be) but the action required is not immediately apparent. Alternatively, one might say a problem exists when someone wants something and doesn't know what to do to get it. **Note:** *In ordinary usage in the world of work, the word problem typically refers to a "bad" situation, one in which something has gone wrong. This is generally viewed as something that should not have happened in the first place. Further, it is probably the case that someone will be punished if the guilty party can be found. (Which explains why it's often difficult to get people to talk about problems.)*
Problem Label	The name used to classify problem (e.g., it's a "training" problem, it's a "personnel" problem, or it's a "production" problem). The label placed on a problem invokes a certain worldview or frame of reference and thus places a set of conceptual "blinders" on the problem solver.
Problem-Solving	The process of gathering and analyzing information so as to reduce uncertainty regarding the action to take with respect to a problem. In other words, problem-solving is the process of figuring out what to do about a problem.
Problem Space	That area wherein the problem state can be said to reside. This "area" might be conceptual, physical or logical.
Problem State	The situation requiring action, including all the reasons action is required. Sometimes referred to as "What Is."

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Process	The patterned interactions between the inputs to a system and the processors inside the system's boundaries. These processes typically transform inputs into outputs. Another name for these interactions is "routines." The problem-solving process, then, is a label for the interactions between the problem solver (i.e., the processor) and information about the problem (i.e., inputs to the system).
Proximate Results	The direct and immediate effects of action.
Proximate Variables	See Accessible Variables.
Reference State	The desired or required value for some target variable. Synonymous with goal state.
Results	The effects of actions. These may be proximate (i.e., immediate and direct) or ultimate (i.e., delayed and indirect).
Search	The process of examining the structure of the situation in which a problem is embedded for the purpose of identifying change targets. Search also includes identifying ways and means of changing these factors (see Operands).
Search Space	That area where the problem solver will search for a solution. Like "problem space," this too might be a conceptual, physical or logical area. Typically, the search space is defined by the structure of the situation in which the problem may be said to be embedded.
Solution	A course of action that leads to the desired results that define the solved state. In effect, a solution is a course of action that closes the gap between what is and what should be and, in so doing, eliminates the requirement for action.
Solution Engineering	The process of skillfully, artfully applying scientific and technical knowledge in crafting and carrying out courses of action that produce desired results.
Solution Implementation	The process whereby an intended course of action is carried out. This is very much a process of intervention.
Solution Path	The routes by which the direct actions of an intervention propagate through the structure of the situation to produce the desired changes in the value of the Target Variable. Typically consists of Accessible, Connecting and Driver Variables.
Solution Identification	The process whereby a course of action intended to produce desired results is determined.
Solved State	Some set of required or desired results. These are the conditions or circumstances that would prevail or exist if the problem were solved. Sometimes referred to as "What Should Be." Synonymous with Goal State.

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Solving Problems	The activities involved in investigating and then intervening in situations that are characterized by difficulty, perplexity, and uncertainty so as to attain one's goals and objectives. It is useful to conceive of two sub-processes: Solution Identification, and Solution Implementation.
Structure	A term used to refer collectively to (1) the elements or factors making up a situation, (2) their connections to one another, and (3) their relationships. A flowchart, for example, depicts the structure of an operation.
Structuring	The process of factoring or decomposing a complex problem into smaller or simpler problems.
Synthesis	The forming of a logical or physical entity from separate elements as a result of establishing or identifying connections and relationships – the act of putting things together.
System	Any arrangement of resources and routines organized to produce results that match a set of requirements. **Note:** *Common usage often equates "system" with "computer," a particularly egregious error in thinking, stemming no doubt from the tendency to think of systems in terms of inputs, processes, and outputs.*
Target Variable	Some aspect of the environment over which you wish to exercise control so as to bring the value of that variable to some specified state.
Ultimate Variable	Same as Target Variable.
Vertical Disconnect	A breakdown in the linkages between problem and solution that occurs in the hierarchical structure of an organization. **Note**: *Typically, this is the result of top management defining a problem, middle management analyzing and "solving" it, and line management or supervision implementing the solution.*
Well-Defined Problem	A problem for which there is a clear, unambiguous test or measure of its resolution. In other words, there is a way to tell if it has been solved.
Well-Structured Problem	A problem for which the relevant variables, connections, and relationships are known and understood.
What Is	A description of some situation as it presently exists (see Problem State).
What Should Be	A description of some situation as it is wanted, desired, expected or demanded (see Solved State).

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Term	Definition
Wicked Problems	Problems with no clear end state, no clear measure of resolution, shifting structures, and conflicting views.

For More Information

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