Problem Solving Methodology Review Summary

David Conley - 2014

Summary of Techniques as Problem Solving Tools

LI#	Tool/Method	Primary Focus	Administrative (A) Technical (T)	Solution Generation Tools?	Pros	Cons
1	Brainstorming	Spontaneous generation of solutions	A	Yes	Rapid and extensive solution generation	Process is marginal at generating effective and workable solutions especially if the brainstorming is not focused on a well defined model of the root problem
2	Contradiction Analysis (TRIZ)	Analyzes contradictory requirements within a system	T	No	Allows the problem solver to view a problem in its most elementary state in order to fully understand what within the system is making contradictory demands of the system	If the problem solver does not already have a good understanding of the system components, or root causes, that are responsible for the contradictory demands on the system then a methods must first be employed to identify the contradictory system limitations
3	Functional Analysis	Structured representation of functionality	T	No	Combines textual information (components and functions) with a graphical format (functional mapping) to create a visual record of how a system operates and what its strengths and weaknesses are	Has no solution generation tools to support elimination of the initial issue
4	Kepner Trego	Alternative selection by way of numerical scoring	A/t	No	Provides a quantitative method that supports root cause determination	Has no tools in support of the development of solutions (changes), innovative or otherwise.
5	Lean	Waste Elimination	A/t	No	Focus on waste reduction, opposed to a general focus on problem solving, and has somewhat well defined operating definitions and guidance	Non-system level approach and the inability to thoroughly technically direct the problem solver in waste elimination
6	PDSA Cycle	Change Testing	A	No	Guidance it provides to the planning in understanding how changes made to a system effect that system and the guided response to the measurement of the change effect	Has no tools in support of the development of solutions (changes), innovative or otherwise.
7	RCA (root cause analysis)	Root cause identification	T	No	Combines textual information (reasoning) with a graphical format (RCA mapping) to create a visual record of what situations are contributing to an issue. Further this visual record also reveals the relationships between the various RCA paths (chains) so that convergent solutions can be applied often creating more efficient solution paths	Has no solution generation tools to support elimination of the initial issue or the identified root causes
8	Six Sigma (DMAIC & DMADV)	Variation reduction	A/t	No	Ability to capture analysis requirements for success, the quantification of system performance levels from before and after changes have been implemented, and the focus on follow-up and continuous monitoring	The fourth step of both DMAIC (Improve) and DMADV (Design) are poorly, if at all, supported by any technical processes within the mainstream usage of Six Sigma. In other words, the problem solver is instructed to improve and design at this step but left pretty much up to their own devises in how exactly to do so
9	Su-Field Analysis (TRIZ)	Abstraction and qualification of substance and field interactions	T	Yes	Breaks mental inertia by suggesting specific and proven solution paths based on the structure of the initial problem model	If the problem solver does not already have a good understanding of the system components, or root causes, that are responsible for the contradictory demands on the system then a methods must first be employed to identify the contradictory system limitations
10	Systems Engineering	identified properties of systems as a whole	A/t	No	Combines textual information (components and functions) with a graphical format (functional mapping) to create a visual record of how a system operates and what the system's useful and harmful functions are	Has no solution generation tools to support elimination of the identified issues
11	Technically Focused Brainstorming	Targeted solution generation	A/t	Yes	Guides the problem solver to create solution concepts that will resolve system contradictions and improve the value of the system under analysis	Can only be applied in problem solving efforts where Contradiction Analysis and resolution has been completed
12	Trends (TRIZ)	Guiding advancements based on empirical data regarding historical changes to similar systems	a/t	Yes	Accurate method of "seeing" upcoming changes to systems	Links between various trends is weak and application algorithms do not exist for all trends
13	Six Thinking Hats	Structuring human thought based around 6 specific "Brain Challenges" allowing individuals to develop tactics for thinking about particular issues	A	No	Guides parallel thought process for groups of people and supports the consideration of a variety of view points	Has the potential to create conflict if not well facilitated and does not insure a structured or repeatable process in focusing on root causes or effective solutions
14	Inventive Principles (TRIZ)	Complete set of methods used to resolve contradictory system requirements	T	Yes	Reduced mental inertia by focusing problem solver on successful solutions to system challenges	Can only be applied in problem solving efforts where Contradiction Analysis has been completed