Solutions That Make a Difference

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Can team members enjoy structured problem solving and still achieve substantial improvement for the organization? The answer is an unequivocal, "Yes," and when team members get to the point of selecting solutions, their spirits often rise.

After what seems like a long and tedious journey through data collection and analysis, the improve phase of the define, measure, analyze, improve and control (DMAIC) process encourages creativity and innovation—two processes that team members tend to find enjoyable.

Despite these facts, though, many of the solutions developed by teams are never approved for implementation by management or fail to eliminate the root causes sufficiently. Why is it so difficult for team members to tap into their natural creativity, and at the same time devise solutions that can be implemented effectively and efficiently—and maintained over the long haul to attain sustainable improvement?

Psychological factors that undermine solution generation

"Inventive as we can be in solving problems, the correct answer may elude us," David Myers, a noted psychologist, wrote. "Two cognitive tendencies—confirmation bias and fixation—often mislead our search for a solution."[1] Here are some basic definitions of these two behaviors:

Confirmation bias involves our natural predilection to seek facts and data that confirm our preconceived ideas. It is characterized by our reluctance to obtain information that disproves our beliefs.

Fixation involves our innate tendency to approach problems in a particular way, especially a way that was successful in the past. Although past successes can be applied to new problems, that experience also may interfere with our ability to find a new solution.

The tendency to repeat past solutions is called "mental set," and it is a prevalent form of fixation. The other form is labeled "functional fixedness," and it involves our tendency to think of things only in terms of their usual functions.

Myers gives this example: "A person may ransack the house for a screwdriver when a dime would have turned the screw."[2] The puzzle shown in the sidebar, "Fixating Inside the Box," (p. 34) provides an example of how fixation affects our thinking.

Identifying the best solution

During the improve phase, the team brainstorms and considers a variety of possible solutions. Of course, previously successful approaches are sure to emerge in these brainstorming sessions. When the team begins to evaluate its list of possible solutions, team members are likely to favor the ones that align with their biases.

Many of the norms that teams follow are designed to keep these evaluation discussions balanced, such as listening with an open mind, keeping individual members from dominating the conversation, and seeking consensus. In a perfect world, these practices would ensure that every proposal receives fair consideration, but we all know that it's not a perfect world.

Additionally, it is unlikely that the optimal solution appears on that original brainstormed list. Generally, the optimal solutions reflect combinations and restructured versions of the original solution ideas. They are shaped from fragments into comprehensive solutions that truly eliminate root causes. The process of evaluating and reorganizing the original ideas, however, can be hampered by the previously described psychological issues.

Most teams are able to avoid truly unsuitable solutions—ones that fail to have a noticeable impact on the root cause, introduce significant negative consequences, are resisted adamantly by affected co-workers, or create long-term animosity among team members.

On the other hand, many teams never find the solutions that will eliminate the root cause permanently—at the lowest cost with the least disruption of opera-

tions and the greatest support from affected associates. The tendency to hold tight to the initial, preconceived solutions is a major factor that limits the team from obtaining the truly optimal solutions.

Two activities to improve solutions

The two approaches described here can be used to improve the solution-development process.

"Prove me wrong" is an activity that team members can use to evaluate the list of suggested solutions. Four evaluation criteria are used for most problems, but additional criteria also may be included in the assessment process:

1. **Root cause fit.** This criterion generally involves multiple sub-criteria. The team develops these based on a thorough analysis of the root cause and what is necessary to eliminate it. Eradication of a root cause often requires changes to equipment, materials, procedures and management system. Each of these would be considered separately.
2. **Complexity.** More than one component usually is involved with this area, too. The basic criteria include the length of time required to implement the change, the number of people affected, the number of process steps affected, the change in information flow required to support the new process, and the space, facilities and equipment required.
3. **Cost.** At this stage, the team does not need precise cost figures. Generally, ratings of high, medium, and low are sufficient, but the team may need to determine some approximate costs for solutions that have many unknown features.
4. **Stakeholder feedback.** Many teams wait until a final solution is tested and verified before seeking management approval or checking with other stakeholders to learn their concerns. In this approach, all key stakeholders, including authorizing managers, customers, and coworkers, are asked to provide feedback regarding the proposed solutions while options are being considered.

The prove-me-wrong process has five steps:

1. The team establishes the evaluation criteria and constructs an appropriate worksheet—usually on a spreadsheet.
2. A brief description of each proposed solution is listed on the worksheet. Details are inappropriate at this point. Think of these as "skeleton" solutions that will have "meat and bones" added later.
3. The first proposed solution is evaluated for root cause fit and complexity. Team members are instructed to bring a disproving mental process to the task, being critical, but not mean. This approach is in direct opposition to the normal process of trying to find value in every suggestion. It identifies the weaknesses in each suggestion so that they can be addressed. Each team mem-

FIXATING INSIDE THE BOX

The diagram shown in Figure 1 is commonly called the "nine-dot problem." The instructions are to connect all nine dots by using only four lines and without lifting the pencil from the page. This is a cognitive-thinking problem that demonstrates how challenging it is for our minds to move outside of their conditioned boxes.

Now look at the solution in Figure 2. Obviously, the key to solving this problem is to "think outside the box." Unfortunately, few of us are able to avoid fixation, the inability to see a problem from a new perspective.

Figure 1. **Nine-dot problem**

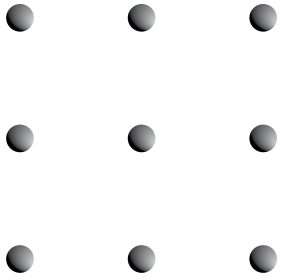
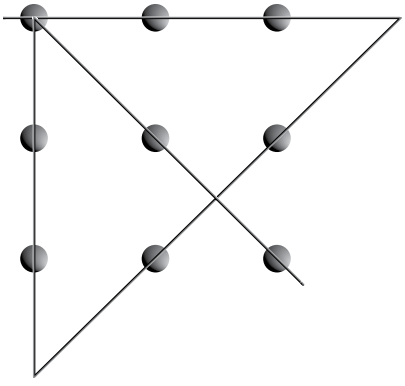


Figure 2. **Nine-dot solution**



ber is expected to offer at least one negative consideration for each criterion for each solution. This means that even the originator has to set aside his or her bias and find something wrong with the suggestion.

Although this is a fault-finding process, it does not need to be heavy handed. Team members don't need to agonize over the evaluation, and the mood can be lighthearted. It's usually best to go around the room, asking each team member to offer one fault and repeat that process until no more faults come to mind. As the evaluation process continues, encourage team members to consider the solutions more deeply (without becoming obsessed with identifying every obscure potential negative occurrence).

4. **Rank the costs.** Each team member individually rates the costs from highest to lowest. The individual ratings are compiled to determine the overall ranking.
5. **Gather stakeholder feedback.** Meet with a cross section of representatives of the identified stakeholder groups. Present a brief description of each possible solution and capture their feedback on its strengths and weaknesses. Summarize the weaknesses on the worksheet and set the strengths aside for use in action planning if the solution is accepted.

The solution-scramble process follows the prove-me-wrong analysis. It involves constructing a new solution from the portions of the original suggestions that were not problematic. The team begins this work by looking at the first proposed solution and its evaluation. Any aspects of it that do not have flaws are listed on a flip chart as bullet points. The list of solution components continues until the best aspects of all the original proposals are shown.

Next, the team looks at the root cause fit criteria and asks, "Are there any portions of the root cause that these bullet points will not eliminate?" If there are, the team develops solution components that are designed specifically to address those deficiencies and adds them to the list as new bullet points. At that point, the bullet points are reorganized and rephrased to create a new comprehensive solution that contains the best features of the original proposals—one that satisfies the evaluation criteria well.

Eliminating the shadow of doubt

Up to this point, the solution-selection process described here relies largely on team members' collaborative intuition. Although the prove-me-wrong and solution-scramble activities reduce team members' biases, the selected solution still is based primarily on team members' judgment and experience.

That is why the improve phase requires testing the most promising solution and revising it based on the pilot results. This is where science validates intuition, resulting in a proven solution, rather than an inspired one.

REFERENCES

1. David G. Myers, *Psychology*, Worth Publishers, 2004, pp. 387-388.
2. Ibid.

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