Problem Solving

Cognitive Lesson Objective:
- Comprehend the Practical Problem Solving Method.

Cognitive Samples of Behavior:
- Summarize the objective of the Practical Problem Solving Method.
- Explain the Practical Problem Solving Method.
- Identify the steps in the Practical Problem Solving Method.
- Differentiate between appropriate and inappropriate application of the steps in the Practical Problem Solving Method.
- Determine appropriate courses of action in a Problem Solving scenario.

Affective Lesson Objective:
- Respond to the importance of the Practical Problem Solving Method.

Affective Samples of Behavior:
- Explain the benefits of utilizing the Practical Problem Solving Method.
- Summarize the importance of systematic problem solving.
- Actively participate in practical exercise.
Have you ever thought you solved a problem only to have the same problem return? That happens when we eliminate a symptom of a problem instead of identifying and solving the root cause of a problem. As future Air Force officers, solving problems is often an important part of your job. If you can quickly analyze problems and solve them correctly, you’ll be a more effective leader. Fixing symptoms instead of solving problems only creates more work later. Fortunately, for those of us who like to fix the problem not the symptoms then move on to other problems, the Air Force has adopted the Practical Problem Solving Method based on the OODA (Observe, Orient, Decide, Act) Loop. The Practical Problem Solving Method is what was formerly referred to as the Eight-Step Problem-Solving Process.

The OODA Loop is an objective description of the decision-making process. Because of Col Boyd’s emphasis on the infinitely repeating nature of decision making, it is an excellent match for the principle of Continuous Process Improvement (CPI). Both principles are based on the concept that the decision-making process is never actually complete. The Air Force takes the four steps of the OODA Loop and further breaks it down into a Practical Problem Solving Method roadmap that is flexible enough to be effective at any level: Air Force, MAJCOM, wing, squadron, and the individual Airman.¹

Consistent application of the Practical Problem Solving Method—via the OODA Loop—provides Air Force leaders with a common format for presenting data, problem-solving facts, and information. It also provides a common language, which will more easily translate into a common understanding throughout the Air Force. As Air Force leaders begin to hone their understanding of how they and their organizations solve problems and make decisions, they will learn to recognize the difference between time spent constructively solving problems at the root-cause level and wasting time spinning their wheels.² Problem solving is one of the most important skills for Air Force leaders. As future Air Force officers, you’ll face situations every day where you have to make decisions and solve problems.

Just to be clear, the objective of the Practical Problem Solving Method is to help Airmen focus their problem solving skills on big issues that affect our mission, our workcenters, and our people. It is a team-centered, systematic, common-sense approach aimed at increasing combat capability, making Air Force units more effective and efficient, and enhancing and enabling the war fighter. As monetary, human, and equipment resources continue to shrink, every Airman must be mindful to get the full effect from every effort. In other words, we cannot afford to waste our time on tasks, projects, or myriad other things that don’t add direct value or impact to our organization’s, or the Air Force’s, mission.

As you read this study guide, do not get too wrapped up in memorizing which steps of the Practical Problem Solving Method correlate with steps within the OODA Loop. In its simplest form, the OODA Loop is a process where decision makers take a good look at the current situation and gather data and information about the problem (Observe), analyze the data and information to substantiate theories about the problem (Orient), develop solutions to address the problem (Decide), and then implement and evaluate their
solutions (Act). The real takeaway from this lesson is your understanding that problem solving and decision making are never-ending processes aimed at constant, continuous improvement.

Figure 1 provides a graphic representation of this process. Take a look at it now, then refer to it as necessary as you complete this reading assignment.

Figure 1. OODA Loop/Practical Problem Solving Method

Step 1: Clarify and Validate the Problem

As stated earlier, the Practical Problem Solving Method is designed to tackle issues that impede the organization’s mission, goals, or objectives. Therefore, there are a few questions a problem solving team should ask before tackling any problem:

- Will resolving this problem directly contribute to organizational strategic goals?
- Will resolving this problem directly address organizational level weaknesses?
- Is there a performance gap (difference between what we should be doing versus what we are doing) that is preventing the organization from moving forward?
- Has anyone actually observed the problem as it currently exists?

If you answer no to all of these questions, then you can probably keep an eye on the situation and continue with business as usual. However, if you can answer yes to any, or especially all, of these questions, then it’s probably a good idea to press forward with your problem-solving efforts.
If your team hopes to succeed in its problem-solving endeavors, the first thing it must do is define the problem by stating the current condition in terms that are, when possible, clear, specific, objective, and measurable. A clearly defined problem allows teams to focus on moving forward and resolving the problem with as little turmoil as possible. For many teams, nothing may be more important in the problem solving process than a clearly defined, objectively stated problem.

When developing a problem statement, it’s crucial for problem-solving teams to develop one that accurately and clearly describes the current condition faced. It should be a short, written statement that is factual, objective, and agreed upon by all members of the team. A good problem statement should address what the problem truly is and not focus merely on symptoms of the problem. It should also highlight where and when the problem occurred, as well as why this problem is significant, because some problems are more critical than others. Don’t forget to ask the all-important question: “Will solving this problem further the strategic goals of my organization?”

There are several tools you can use to clarify and validate organizational problems: Strategic Alignment and Deployment, Voice of the Customer, and Go and See. (NOTE: There are several tools available in the Practical Problem Solving Method. This lesson will only address a few. The tools discussed in this lesson are neither mandatory nor locked into their particular step. Any mechanic knows that you should always use the right tool for the job. Use these tools as, and when, you see fit in your problem-solving adventures).

Strategic Alignment and Deployment (SA&D) is a systematic method used to ensure everyone in an organization is working effectively toward the same goals identified by senior leadership. It ensures resources and activities are linked to the key strategies, directives, and goals of the organization. It is built on the premise that individual and team problem solving-efforts will have greater impact if coordinated with the rest of the organization.

Another tool you can use is the Voice of the Customer. Before you get all bent out of shape over the term customer in a military setting, keep in mind that we all have customers (end users if you prefer) who benefit from the products or services our organizations provide. If you work in finance, you consider anyone who files a travel voucher your customer. If you work in security forces, consider those you protect your customers. Regardless of what we do, or where we work, we all have someone who benefits from our work. These beneficiaries are our customers, and they tell us what they consider important and not important. They are the voices telling us which processes truly add value and those that are simply time wasters. Failing to properly identify customers and their needs can lead to big problems within our organizations.

The third tool available in this step is called Go and See, and it means exactly what it says. The best way for leaders to spot problems is to get up and walk around their workcenters to observe firsthand what is actually taking place. In its simplest form, problem solving is a logical, common-sense, fact-based, step-by-step approach based on a “go and see” philosophy. It is a practical skill that requires leaders to visually capture and understand
what is actually happening in their workcenters, versus what should be happening.\(^5\) By applying a go and see mentality, leaders can establish a true cause and effect relationship of problems based on fact, not assumptions.

**Step 2: Break Down the Problem and Identify Performance Gap**

Once the proper target is identified and the problem is clearly defined, information and data should be gathered about the problem area. This can be a frustrating step for Airmen who want to move directly into taking action and implementing solutions. However, it’s important for all Airmen to understand that the better they understand a problem, the better the solution will be. Only by thoroughly evaluating problems before implementing solutions are problem-solving teams able to judge the impact of the later solution implementation.\(^6\)

You should be asking several key questions when gathering and analyzing problem data.

- Does leadership have enough information to make a decision, or is more information needed?
- Is there a performance gap? Should a Performance Gap Analysis be conducted? A performance gap is the difference between your organization’s current performance and what its performance should actually be. If customers are unhappy, or if a process is not performing well, you must decide how and where the process is deficient. Performance gap analysis will help you do this.
- Does the data point to any specific areas of root cause?
- Does the data indicate a bottleneck or constraint? If so, Bottleneck Analysis is the tool you want to use here. Every process has one step that is slower than the rest that controls the speed (throughput) of the entire process. Bottleneck Analysis is designed to help problem solvers speed up the slower process, slow other processes down relieve pressure on the slow process, or a combination of the two.\(^7\)

A team’s first step in assessing a performance gap is to identify and review Key Performance Indicators (KPI) and metrics from workcenters. Whether or not you want to admit it, every organization in the Air Force uses some form of metric or key process indicator to indicate if goals and objectives are being met. For instance, flight-line maintainers are very well aware that mission capable rates, abort rates, and on time launch rates are just three of many measurements used to indicate how well the unit meets its flying mission. Many pharmacies in the Air Force use customer wait time to determine how well they are meeting customer requirements. Even the people who designed and developed this lesson use data to assess and improve the Holm Center curriculum. No, really! We look at test data and a host of surveys to determine how well the Holm Center curriculum meets the needs of our students and the Air Force.
It’s important to note that KPIs and metrics are not designed to create more work. On the contrary, well-designed KPIs and metrics should not only help organizations assess how well they meet mission requirements, but should do so without adding additional expense or burden to other organizational processes. Well-designed metrics should have six characteristics based on the acronym: B-SMART.

- Balanced: Ensure goals are balanced across the multiple fronts of organizational output and multiple targets. In other words, ensure your metrics don’t create work for another unit or organization.
- Specific: Have desirable outputs based on subject matter expert knowledge and experience, and applicable to the process-improvement activity.
- Measurable: Include time frames and have data obtainable from specific sources.
- Attainable: Resources are available. Some risk may be present, but success is possible.
- Results Focused: Link to the mission, vision, and goals, and be meaningful to the user.
- Timely: Provide step-by-step views versus giant leaps, and be measurable at interim milestones.

Two other concepts to consider in this step of the problem solving process are value and waste analysis. As stated earlier, value in any product, service, or process is determined by your customer and by your customer only. Always look at your processes from your customer’s point of view. What do they want from your process? If you add something new to your process, is your customer willing to pay extra or wait longer? If you take something away from your process, will they miss it? If not, then they probably don’t consider your efforts as valued added.

Waste is anything that uses resources but does not add real value to the products or services in your organization. It is anything that takes time, resources, or space, but does not add to the value of the products or service delivered to your customer. Once you’re tuned in to detecting waste in a process, you can’t help but see it everywhere. If you’ve ever waited in line at the Department of Motor Vehicles (DMV), you’ve experienced waste. If you’ve ever printed extra copies of a report “just to be sure we don’t run out,” you’ve experienced waste. If you feel like you’re being underutilized in your workcenter, then you know what waste is. The fact of the matter is that we’ve all experienced waste. In fact, up to 95% of our work processes are full of waste. Recognizing the different forms of waste is vital to helping problem solvers identify performance gaps. There are eight different types of waste discussed in the Practical Problem Solving Method. As you read these definitions, think about the different forms of waste in your own workcenter. The eight different types of waste are as follows:
• Defects: Work that contains errors, rework, mistakes, or lacks something necessary.

• Over Production: Gathering or creating more of something than is needed at that moment.

• Waiting: Idle time created when material, information, people, or equipment is not ready.

• Nonstandard Overprocessing: Efforts that create no value from the customer’s perspective.

• Transportation: Movement of information, equipment, or resources that does not add value.

• Intellect: Any failure to fully utilize the time and talents of people.

• Motion: Movement of people that does not add value.

• Excess Inventory: More information, equipment, or material on hand than is needed at the moment.

Arguably, some waste is unavoidable. For instance, reports, aircraft, or information has to travel from one location to another. At times, safety concerns require repeating steps or being extra cautious when performing tasks. On the other hand, identifying and eliminating unnecessary waste in our workcenters is one of the core foundations to any CPI initiative, and is a vital step in the Practical Problem Solving Method. One way we can spot unnecessary waste is to transform our mindsets on how we complete tasks, constantly look for waste in our processes, and always, always remember that it is the customer, or end user, who determines value.

Step 3: Set Improvement Targets

In the first two steps, you clarified the problem and identified gaps in your process’s performance. In this step, your task is to set improvement targets for where you want to be. Setting improvement targets is completed on two levels simultaneously—strategic and tactical. Strategic targets are visions of what the organization should strive to become. This vision should be a view into the future that succinctly describes how your organization will conduct business. It implies a gap between your current state and a better, future state. Tactical-level targets define the performance level necessary to make your strategic vision a reality. Targets should be challenging, but achievable, and have B-SMART characteristics.

Two tools that can help you set targets for improvement are Ideal-State Mapping and Future-State Mapping. Ideal-State Mapping is nothing more than thinking about how your process would operate in a perfect world with no constraints: no financial issues, no manning issues, no equipment issues…no waste! This is your chance to be king for a day and design the perfect process.
This is the time to use your imagination to innovatively generate ideas on how that perfect process would look. This stage requires more creative thinking than any other in the process. A team allowing its members the freedom to explore several wild, even crazy ideas stands a better chance of developing a better future-state map later in the problem-solving process.

This is the fun part of problem solving. Now you get to “think outside the box,” “shift the paradigm,” “break the mold,” etc. For some, the thought of thinking creatively scares them half to death. Don’t worry—creative thinking is nothing more than changing old ideas to create brand new ones. To put it another way, creative thinking is nothing more than taking a different approach to a common situation. In case you still doubt the power of creative thinking, think about how creative thinkers have changed the world. Let’s face it, countless individuals have made a lot of money with their creativity, and some of it isn’t really that great! For instance, how many of you would agree that the pet rock is silly? Come on—it’s nothing more than a rock with eyes glued on it! However, somebody saw that rock for what it could be—not what it was—glued some eyes on it, and made a small fortune. Creative thinking. Want more? How about thunder sticks, beer hats, disposable cameras, and personal computers? Yes, just a few of thousands of examples where creativity resulted in products or solutions that made people’s lives better or more enjoyable.

After you create your perfect world, it’s time to put as many of your wild ideas into practice by developing what your process will actually look like in the future. As stated earlier, some types of waste are required by organizational or safety needs, even though they have no role in fulfilling customer needs. A future-state map is a great balance between your ideal process and constraints required by outside forces. A future-state map allows the team to envision what it believes the process can practically be improved to look like. It provides the team with a practical road map of what improvements need to be made to the current state. The goal of the future state is to get as close to the ideal state as practically possible, while being realistically achievable in a reasonable amount of time. Future-state plans should always include those items valued by customers, and should include fewer steps than your current state.

**Step 4: Determine Root Cause**

Along with properly defining the problem, this is the most vital step in the problem-solving process. All too often, Air Force leaders find themselves addressing problems that have been “solved” many times before. This is usually due to problem-solving efforts that are directed toward symptoms of problems rather than root causes. In many cases, root-cause analysis is a trade off between digging as deeply as possible and finding the deepest point that is still within the team’s sphere of influence.

There are three tools you can use to find root causes: *Brainstorming, Cause and Effect Diagrams*, and the *Five Whys*. 

---

*Problem Solving* 133
The best way to identify potential causes is through brainstorming. Brainstorming is a very effective technique that helps generate a large number of ideas. It is a fast-moving process that is most effective in group situations, and can cause a very effective chain reaction as groups collaborate to identify a variety of ideas regarding a problem. Brainstorming is most effective when the following guidelines are followed:

- Avoid criticism and "shooting down" ideas. The idea of brainstorming is to generate as many ideas as possible, regardless of their perceived value at that time. Criticism may restrict the free flow of ideas, and thus defeat the purpose of brainstorming altogether.

- Be open to, and even actively looking for, wild/exaggerated ideas. Sometimes, what may seem like a crazy idea is actually the one you’re looking for, but you can’t/don’t know it at that stage of the process. Be creative when generating possible causes of the problem.

- Aim for quantity, not quality. Generate as many ideas as possible. Later you will evaluate the quality of the ideas and flesh out those that don’t make sense.

- Build on others’ ideas. “Piggybacking” facilitates development of new twists on ideas, problems, or solutions. Sometimes we can generate a new idea by combining two or more ideas together.

- Make a list. Don’t forget to record all your ideas! How many times have you had a great idea that would seemingly revolutionize the world and make you rich, but you failed to write it down and then forgot what it was? Don’t let all your efforts be for naught simply because no one thought or bothered to take notes.

Another way to identify potential causes is with a Cause and Effect Diagram. This tool, also known as the Ishikawa or fishbone diagram, is great for finding the real cause of a problem, and is often used in conjunction with brainstorming. It helps identify potential contributory causes of a problem, prior to planning, in an effort to remove the most powerful causes of the problem. When using the fishbone diagram, you could say that teams are fishing for clues as to the potential root cause(s) of a problem. To use the diagram, first condense the problem statements to a few words that effectively describe the problem. Write your condensed problem statement in the box serving as the fish’s head. Next, determine the major categories of the problem, and list those in the boxes making up the fish’s body. These categories can be tailored to each team’s specific situation or problem-solving needs, but the most popular are the 3 Ms and a P: Machines, Methods, Materials, and People. Don’t get caught up in defining the categories—remember, the goal in this step is to determine causes of the problem. Brainstorm to identify potential causes, and then list them under the appropriate category. Teams might discover that some potential causes can be listed under more than one category. In addition, as teams use the tool, they may even find there are secondary causes for primary causes already identified.
After identifying potential causes through brainstorming and using the cause and effect diagram, it’s time to determine the most likely or root cause(s). This can be done in one of two ways. First, look at your fishbone diagram. Are there any potential causes that are listed more than once? Do they appear in more than one category? If so, you may want to highlight those as potential root causes of the problem. The second way to pare down potential causes is through the 5 Whys technique. This technique identifies root causes by asking “Why?” until the question can no longer be answered.

**Step 5: Develop Countermeasures**

The decision-making and solution-development step is over halfway through the Practical Problem Solving Method. If the first four steps were done correctly, this should be the easiest step of all. As simple as this step should be, there are some very important guidelines Air Force leaders must follow to ensure the greatest likelihood of success. The key principal to remember in this step is that the impact of a solution is a combination of the quality of the solution and the acceptance of the solution by the people who must implement it.

\[
\text{(Quality of Solution) \times \text{(Acceptance)} = \text{Impact}}^{15}
\]

You can work hard to come up with the best solution in the world; however, if it has no support, it will have zero impact. On the other hand, you can develop an average solution and achieve great impact with good support. The first half of the Practical Problem Solving Method is dedicated to developing a quality solution. In the second half, leaders are charged to present the solution in such a way as to gain its acceptance by those who must implement it.\(^{16}\)

In the previous step, creative thinking played a vital role in generating ideas for possible solutions. This step requires more analytical thinking and focuses on selecting the best solution, or solutions, to the problem.

Two tools to help your team develop countermeasures are **Analysis of Alternatives** and **Action Plans**. In team problem solving, different members of the group can use different criteria to assess the situation, which can often lead to confusion and unclear decision making. To avoid this problem, teams should analyze each alternative by assigning agreed-upon criteria when selecting solutions. Having common, agreed-upon criteria reduces the chances of people selecting solutions only important to them personally by focusing everyone on team-decided goals. When selecting criteria, it is important the team consider all the criteria each person is thinking about, and then allow the team to agree on the choice, and importance, of which criteria the team will use. While the choice of criteria to use is strictly up to the team, there are some factors to consider when analyzing alternatives:

- **Effectiveness**: Can this countermeasure help the team achieve the target or goal? How well will this countermeasure work? Will this countermeasure prevent reoccurrence of the problem?
• Feasibility: Is this countermeasure possible in this situation considering cost, safety, resources, management approval, and time?

• Impact: Will this countermeasure create more problems than it will help solve? What effects will this countermeasure have on my job, team, other operations, and the Air Force?¹⁷

The object of this exercise is to identify strengths and weaknesses of all countermeasures so they can be compared for selection. Countermeasures that do not pass the analysis of alternatives test should be dropped from immediate consideration. Thorough evaluation is done by projecting the outcome of each countermeasure if it were implemented in the problem situation. Outcome is projected in terms of the three effectiveness evaluation criteria. An Alternative Analysis Rating Matrix (see Fig. 2 below) is used to evaluate and rate possible countermeasures on the basis of the three criteria and organize the information for comparison. Various questions are asked for each criterion to project and evaluate the outcome of a possible countermeasure. The specific questions used vary depending on the problem situation.

<table>
<thead>
<tr>
<th>Possible Countermeasures</th>
<th>High Effectiveness</th>
<th>High Feasibility</th>
<th>High Impact</th>
<th>Low Cost</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Countermeasure rating: 1=Low, 2=Medium, 3=High

**Figure 2. Alternative Analysis Rating Matrix¹⁸**

Well, you’ve weighed and selected the best solution(s), so your problem should be solved, right? Wrong. You’ve only solved the problem on paper at this point and still need to put the solution(s) into action to fully solve the problem. An action plan is perfect in this situation because it lets teams communicate what needs done for the solution to be put into action. The action plan is also an excellent tool for estimating what it will take to solve a problem.¹⁹ A well-developed action plan will tell teams…

• what tasks or activities need to be carried out to implement the solution;

• who will be responsible for each task or activity; and,

• what the target dates are for completion of each task or activity

When developing an action plan, always consider those who will be affected and the resources necessary to carry out the plan. Also, keep leadership informed on the status of the action plan. Providing the boss a courtesy copy of the action plan and any subsequent changes not only keeps him or her informed, but also demonstrates that the team has the situation under control and is using a systematic approach to resolving the problem. Keep in mind that coordination with outside agencies or personnel is an important step in the action plan. Some of the plan’s taskings may fall outside the responsibility or capability
of the team, so it’s vital that any agencies used in the action plan are well aware of their role(s) in the plan. As with most plans, flexibility is important. Be prepared to change the action plan to account for unexpected events. Being flexible toward circumstances or situations beyond the team’s control is key in completing the problem-solving process. Planning to implement a solution requires a combination of sheer hard work and creativity. Failure to use imagination here, leaving detail to chance, will lead to chaos and lack of credibility in the future.20

<table>
<thead>
<tr>
<th>Action Step/Task/Activity</th>
<th>Responsible Group/Person</th>
<th>Start Date</th>
<th>End Date</th>
<th>Estimated Hours</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Totals

Figure 3. Action Plan Matrix

The last three steps of the problem-solving process give you the chance to plan, organize, control, and lead the changes implemented during your problem-solving adventures.

Step 6: See Countermeasures Through

No matter how well the team performs in the first four steps, and regardless of how well it draws up an action plan, no problem is truly solved unless someone monitors progress and ensures the plan is on track. Be prepared to modify the action plan when the unexpected happens. Don’t be so focused on carrying out the action plan that you lose the flexibility to deal with the unknown. By tracking the implementation of the action plan and evaluating its progress, teams will ensure solutions are being implemented even with those unexpected changes.22 During this step you need to be sure to accomplish three things:

- Collect data according to the action plan. With an effective monitoring system, teams can determine whether specific tasks are being performed, or if short-term targets are being achieved as planned.
• Implement contingency plans. As conditions change, implement necessary contingency plans to continue moving toward your desired goal.

• Provide required training. There is always some form of training required to make the solution work. The training can often be linked to the communications plan developed in step five, “develop countermeasures.” The training is usually needed at several levels simultaneously. Implementers and front-line supervisors need the most intensive training with less detailed, but no less important, training at echelons above.23

There are numerous process improvement tools that improvement teams can select and use to help see countermeasures through; however, we'll only discuss the following in this lesson: Visual Management, Six S, Material/Information Flow, and Standard Work.

Visual Management is nothing more than using simple visual indicators throughout the workcenter that let people know if they are working within a standard or not. Visual displays used in the workcenter (color-coded files, production status boards, shadow boards, etc.) should make it easy for someone who knows nothing about a process to quickly assess the current situation. Visual management provides leaders with self-running, self-regulating organizations. A visual workplace stresses communication via bulletin boards, graphics, status boards, web portals, dashboards, etc., that makes performance of the process immediately visible to anyone walking in the area. The purpose is to assure that everyone knows the current priorities, status, and upcoming events, with no filtering.24

When implementing countermeasures, the need for a stable foundation arises. The appropriate response is to establish the fundamental disciplines that will drive the implementation of problem solving forward. Six S is one of the most important disciplines in continuous process improvement. The ordering of a work area into a clearly visual managed area where there is a place for everything, everything is in its place, and the standard established is sustained, requires the use of Six S. The need for Six S is visually determined by asking three most basic questions:

• Is the workplace standard or nonstandard?
• Is the placement of materials, equipment, and work instructions aimed at reducing waste?
• Can you determine what is important by the visual state or status of work?

Six S is a structured process for bringing affirmative answers to the above questions and provides the foundation for visually managing the workplace. It is a basic, fundamental, systematic approach for productivity, quality, and safety improvement in all types of business. Each “S” stands for a step in achieving workplace order, focusing on achieving visual order, organization, cleanliness, and standardization.
• Sort: This is the first step in cleaning and organizing things. Sort through everything in the work area, keeping only what is necessary and discarding items that are already used/no longer needed. Everything not used frequently should be moved to a separate, common storage area.

• Straighten: This involves organizing, identifying, and arranging everything in a work area. There should be a “place for everything and everything in its place,” with everything properly identified and labeled.

• Shine: This is simply the regular, usually cleaning and maintenance. You’ll need to inspect everything while cleaning, including machines, tools, equipment, and supplies.

• Standardize: This step calls on simplification and standardization, and once completed makes it easy to maintain your processes and procedures. Identify then standardize the fastest, safest, best quality, repeatable steps, but be sure to allow for individual creativity in improving the standards.

• Sustain: Once established the focus shifts to continued training on, and adherence to, the standards. This is best accomplished by establishing a formal system for monitoring the results of Six S. Make needed changes in the standards and provide training that addresses those changes.

• Safety: Make sure that no improvement to the workplace is operating in a way that decreases the level of safe operation in the area.25

Flow is the smooth movement of material, information, or service from one process to another. A good example of material flow is an assembly line where one worker performs a step and passes the work to the next step. The same theory applies to service and information. A well-run dining facility is a great example of service flow. In theory, individual customers should move from one section to another (e.g., meal to drinks to checkout) without holding up other customers. On the other hand, serving five customers in the snack line before sending them to the drink line is called batch and queue and is not flow. Passing on reports or information from one office to another without waiting is an example of information flow. On the other hand, waiting until there is a stack of five or six EPRs on your desk before passing them on to the next step in the process is considered batch and queue and is not flow. Another way to visualize flow is the absence of waste.

Standard Work is the bedrock of continuous-improvement practices. It represents the best-known way to complete a task, and ensures the same work will yield the same results every time. For instance, all weapons load crews are taught to load munitions in a certain standardized way. Each person on a load crew—the team chief, the 2-man, or the 3-man—has the same responsibilities as team chiefs, 2-men, or 3-men on other load crews. This practice not only ensures that each load crew loads munitions in the same fashion, but also allows members to perform similar duties no matter what load crew they may be working with. If you’ve ever been on the flight line, you’ve probably watched crew chiefs launch and recover aircraft. Each crew chief, and each pilot for that matter, is taught one standard way to launch and recover aircraft. This ensures continuity and
safety regardless of who is in the cockpit or who is on the ground. I’m sure that many of you have some form of standardized practices in your workcenters. Standard work is unique to each process, but it all shares certain characteristics:

- should be the best, safest, easiest, most cost-effective and productive way to complete the task.
- preserves the corporate knowledge of everyone who has done the process in the past for the benefit of everyone who will work the process in the future.
- provides the basis for measurement against a standard.
- provides the basis for training future team members on how to perform a task.
- ensures meeting the customer Critical to Quality (CTQ) requirements.
- minimizes variability between process operators. 

**Step 7: Confirm Results and Process**

This step should closely mirror the data-collection portion of Step 2, Breakdown Problem and Identify Performance Gaps. In fact, you had better be using the same KPIs and metrics used in Step 2 to evaluate your progress.

Leadership should ensure the plan is producing the intended results. Has the problem been resolved? Has value been added to the process? Has waste been removed? Has the desired future state been reached? Are plans in place to ensure the problem won’t reoccur? Now is the time to answer all these questions.

The project should be monitored for performance relative to…

- the baseline developed in Steps 1 & 2
- the B-SMART targets established in step 3
- where you thought you would be at this stage of the solution implementation
- meeting targets by the established deadline. If your team is not meeting the target, do you need to return to Step 4, Determine Root Cause? Incorrect root cause is the most common mistake made by process-improvement efforts.

**Step 8: Standardize Successful Processes**

This is the most commonly skipped and under-completed step of the entire Practical Problem Solving Method. It is tempting to take newfound knowledge and skills and immediately move on to the next improvement initiative while skipping the effort of ensuring that the results stick. However, standardizing the successful countermeasures in your problem solving process greatly reduces the risk of the same problem returning in the future. In this step, teams should codify successful countermeasures such as visual
management, Six S, or standard work. For local changes this can be accomplished via local Operating Instructions or policy letters. Are there other requirements outside the team’s span of control, such as AFI or Technical Order requirements? If so, this is when the team should request changes to such restrictions. Teams should also share their successes with other organizations that may be experiencing similar problems. Finally, this is the step where good problem solvers reload their guns and start the OODA Loop all over again to identify new problems in their workcenters.

Conclusion

Using hindsight, you can probably think of instances in your career where the Practical Problem Solving Method would have helped in solving organizational problems. Perhaps you can even identify which of the steps would have been the most critical to arriving at the most appropriate countermeasures. In many cases, properly defining the problem and uncovering the root cause(s) are key to problem-solving efforts. Making decisions and solving problems are tasks that Air Force officers complete every day. Using the OODA Loop and the Practical Problem Solving Method is a good start to helping you make the right decisions in solving problems.

As Air Force leaders, we are responsible for creating an environment where continuous improvement is part of the daily lives of our Airmen. Identifying and eliminating wasteful processes, and creating value in everything we do, will increase combat capability; make our organizations more efficient and effective; and ultimately, enable and enhance the war fighter.

End Notes:
2. Ibid., B-2.
3. Ibid., B-3.
4. Ibid., B-2.
5. Ibid., J-4.
6. Ibid., B-3.
7. Ibid., J-18
8. Ibid., B-4.
9. Ibid., J-12.
10. Ibid., B-4.
11. Ibid., J-20.
12. Ibid., B5.
16. Ibid.
17. Ibid., J-32.
19. Ibid., 105.
22. Ibid., 77.
27. Ibid., B-8.
28. Ibid.

Bibliography: