

UNIT 5

INTRODUCTION TO PROBLEM SOLVING

INTRODUCTION TO PROBLEM SOLVING: What is a Problem?, The Importance of Goals in Problem Solving, What is a Solution?, General Guidelines for Problem Solving-I. Problem Exploration, II. Goal Establishment, III. Idea Generation, IV. Idea Selection, V. Implementation ,VI. Evaluation.

1. What is a Problem?

Regardless of what they do for a living or where they live, most people spend most of their waking hours, at work or at home, solving problems. Most problems we face are small, some are large and complex, but they all need to be solved in a satisfactory way. Before we look at the area of problem analysis and solution, though, let's take a few moments to think about just what we mean by a problem.

One of the creative thinker's fundamental insights is that most questions have more than one right answer and most problems have more than one solution. In keeping with this insight, we will offer more than one definition of a problem, in hopes of filling out its meaning as fully as possible.

1. A problem is an opportunity for improvement. A problem can be a real break, the stroke of luck, opportunity knocking, a chance to get out of the rut of the everyday and make yourself or some situation better. Note that problems need not arrive as a result of external factors or bad events. Any new awareness you have that allows you to see possibilities for improvement brings a "problem" for you to solve. This is why the most creative people are "problem seekers" rather than "problem avoiders."

Developing a positive attitude toward problems can transform you into a happier, saner, more confident person who feels (and is) much more in control of life. Train yourself to respond to problems with enthusiasm and eagerness, rising to the opportunity to show your stuff, and you will be amazed at the result.

2. A problem is the difference between your current state and your goal state. A problem can result from new knowledge or thinking. When you know where you are and where you want to be, you have a problem to solve in getting to your destination. The solution can and should be fun and exciting as you think over the

various possible solution paths you might choose. When you can identify the difference between what you have and what you want, you have defined your problem and can aim toward your goal.

3. A problem results from the recognition of a present imperfect and the belief in the possibility of a better future. Isn't it interesting here that hope produces problems? The belief that your hopes can be achieved will give you the will to aim toward the better future. Your hopes **challenge** you, and challenge is another definition of a problem.

2. The Importance of Goals in Problem Solving

As you read these definitions, I hope you noticed that they all include the ideas of goals and ideal states. Problem solving centers on thinking about goals and ideals. When a goal is met, the problem should be concluded *if the goal was an appropriate one for solving the problem.*

Another way of thinking about this would be to say that the goal or ideal state defines how much of a problem exists or even whether or not there is a problem.

For example, let's say you have just brought a pizza home from the pizza parlor and it is beginning to cool. If your ideal state is to eat very hot pizza, then you have a problem, whether you define it as how to keep the pizza from cooling, how to heat it back up, how to eat it quickly, or whatever. On the other hand, if you like moderately warm pizza, then you do not have a problem. Similarly, if your friend comes over an hour later and you offer him a piece of leftover pizza, only to discover that your oven is on the blink, you have a problem: how to heat the pizza up again. But if the friend says, "I really like cold pizza better than hot," you do not have a problem.

This example demonstrates that one's goal must be considered in conjunction with one's current state in order to determine whether a problem exists and to what extent it exists. People who don't take time to think about their goals before attacking a problem thus don't fully understand the problem. You've probably heard that cracked proverb, "If you don't know where you're going, you'll probably end up somewhere else."

Another important truth to derive from this understanding about goals is that as your goals change, so will the nature of the problems you face. Life operates in real time rather than in timeless theory, so that as we move through our existence, our goals are in a constant state of flux. Some goals change radically, or even reverse, while others undergo minor adjustments and refinements. Be sure that your problems and solutions stay current with your goals.

3. What is a Solution?

In our ordinary discourse, we often think of "solving a problem" in the sense of making it go away, so that the problem no longer exists. This indeed is one kind of solution, but it is not the only kind. Some problems cannot be eliminated entirely: we are never likely to eliminate trash, or the wear on automobile tires, or the occurrence of illness. We can, however, create solutions or treatments that will make each of these problems less harmful.

For our purposes, then, we will define a solution as *the management of a problem in a way that successfully meets the goals established for treating it*. Sometimes the goal will be to eliminate the problem entirely; sometimes the goal will be only to treat the effects of the problem. The possibilities inherent in the problem, together with the ambitiousness, resources, and values of the problem solver, will help shape the goals.

There are two basic approaches to solving problems, one where the cause or source of the problem is attacked and the other where the effects or symptoms of the problem are attacked. For ease of remembering, we can call these the **stop it** and the **mop it** approaches, respectively. Each of these approaches has three basic forms. As we detail these approaches and their forms, let's use the problem of a leaking water tank to illustrate each one.

Stop It

A stop-it approach is designed to cure a problem, so that, insofar as possible, the problem no longer exists. Its three forms are prevention, elimination, and reduction.

Prevent It. By preventing a problem from occurring (or recurring) we have perhaps the ideal solution. In our water heater example, we would build a very

high quality water heater, perhaps with a copper tank, so that it would never leak. The prevention approach is often a difficult one to apply because it requires predictive foresight ("this might be a problem someday if we don't act now") and it is often costly. And, of course, most problems crash into us unexpectedly or for some other reason cannot be prevented.

For example, if you can prevent a cold, or an automobile accident, you will not have to deal any further with a problem or its effects. Similarly, by preventing misunderstandings, the need for lots of damage control and emotional healing can be avoided.

Eliminate It. Eliminating a problem once and for all is also an excellent way of attacking a problem. In our leaking water heater example, an elimination solution would be to plug or seal or otherwise repair the leak, the cause of the problem (all that water on the floor). Elimination solutions should be considered in nearly every problem situation.

For example, a neighbor where I used to live had chronic trouble getting TV reception to suit him. Every weekend he was on his roof installing another antenna (he eventually had three), rotating one, putting another up on a higher mast, and so on. He even put in a satellite dish. He might have eliminated the problem by subscribing to cable TV or moving to an area where the reception was better.

Elimination solutions can be expensive and politically unpopular, however, so that they are not always feasible.

For example, an elimination solution to the AIDS problem might involve changing social behaviors (including sexual practices and drug use). Such changes would be resisted. Thus, the usual approach to AIDS is a mop-it one (see below).

Reduce It. As we mentioned earlier, some problems, like trash production, cannot be eliminated entirely. In such cases, a strategy of reduction can be highly effective. Almost any problem can be made less of one by reducing its size. In our water heater example, suppose we couldn't perform a repair (an elimination solution) until a day or two later. We could reduce the problem by turning off the incoming water. Without line pressure on the tank, the leak would slow down; that would be better than a full force leak.

For example, current approaches to the flow of illegal drugs into the country include reduction strategies. The flow of drugs cannot be eliminated as long as demand continues, so interdiction focuses on "as much as possible."

Mop It

A mop-it approach focuses on the effects of a problem. As you can guess, the name comes from our leaking water heater example. Instead of treating the leak itself, we mop up the water on the floor—the effects of the problem.

Treat It. Here the damage caused by the problem is repaired or treated. We mop up the water, fix the damaged floor, hang the rugs out to dry. Note two things: (1) by itself a treat-it solution is not going to be nearly as effective as some form of stop-it solution and (2) treat-it solutions are often needed in addition to an elimination or reduction form of solution.

For example, some of our drug and alcohol treatment programs are aimed at symptomatic relief of the effects of these problems rather than at eliminating the problems to begin with.

Tolerate It. In this form of mop-it approach, the effects of the problem are put up with. In our leaky water heater example, we might install a drain in the floor, or waterproof the floor. The effects are taken for granted and measures are taken to endure them.

For example, graffiti and vandalism are now taken for granted in many large cities, so tolerance measures have been implemented, such as installing lights that are harder to break or cheaper to replace, not planting trees that would be destroyed, and so on.

Redirect It. Here the problem is deflected. Sometimes the problem will simply be redefined as not a problem. It's hard to think of a legitimate redirection for our leaking water heater problem, but suppose that the leak is small and the floor is not being damaged. We might say, "Well, we need the humidity; the leak is actually a good thing." Remember that a problem is a problem only when someone defines it as such.

Some police departments have been known to buy bus or airline tickets for chronic offenders (prostitutes, usually) to send them to another state far

across the country, thus "solving" their own problem.

Sometimes, as when you get a cold, a mop-it solution is all that's available: there is no elimination solution that works yet. In general, however, be careful to investigate the possibility of implementing a stop-it solution before you focus on mop-it ones. There is a temptation to focus on symptomatic treatments for our problems when we should be looking for treatments of the underlying causes.

4. General Guidelines for Problem Solving

Here are some guidelines that will help you analyze, define, and solve problems in an orderly way. Use these guidelines to help create a problem-solving habit of mind and to give some structure to your problem solving activity. Remember, though, that problem solving does not proceed by recipe, nor is it necessarily linear, as these guidelines might imply. Problem solving is a recursive process; you must continually go back and forth between steps and do some parts again. Similarly, you might not always proceed in exactly this order. Thus, these guidelines are not meant to be rigid and absolute. Think of them rather as a checklist designed to assure that you include all the important features of problem analysis in your thinking. (After the outline of the guidelines you'll find a commentary and elaboration on them.)

I. Problem Exploration

1. State the Problem.

- A. State what the problem is
- B. Restate the problem
- C. State the problem more

2. Clarify the Problem.

- A. Define the Key terms of the problem.
- B. Articulate the assumptions
- C. Obtain needed information

3. Explain the Problem.

- A. Discuss the problem with someone else.
- B. Look at the problem from different viewpoints.
- C. Ask a series of whys.

4. Put the Problem in Context.

- A. What is the history of the problem?
- B. What is the problem environment?
- C. What are the constraints?

II. Goal Establishment

- 1. Consider Ideal Goals.
- 2. Establish Practical Goals.

III. Idea Generation

- 1. Generate Ideas for Possible Solutions.

IV. Idea Selection

- 1. Evaluate the possibilities.
- 2. Choose the solution(s).

V. Implementation

- 1. Try the solution.
- 2. Make adjustments.

VI. Evaluation

- 1. Determine whether the solution worked.

5. Discussion of the Problem Solving Guidelines

I. Problem exploration

The problem is investigated, broken into sub-problems, terms are defined. A determination is made about the nature of the problem (sociological, personal, technological, historical). Some research is made into whether or not it has been met in the past, and if so, how. Steps:

1. State the Problem.

A. State what the problem is. Does it have multiple aspects? If so, what are they? This should include a written description of the problem in the clearest way it can be put. The statement might begin with the problem as given, put in quotation marks to remind you that that's the way it was received. But the problem should always be stated in your own words, too. Make the problem your own, and do not let it become attached to the verbal clothing in which it was originally delivered to you.

A useful aspect of any definition or problem statement is to state what the thing is *not*. By clearly identifying what is *not* the problem, you'll clarify what it is.

B. Restate the problem in entirely different words, or in a completely different way. Do this several different times (three to eight is recommended). Again, the purpose of this process is to break the problem away from confusing or restricting verbal maps of it, so that the "problem in itself" can be isolated.

For example, "Carry the filing cabinet upstairs to my office." How about "Take the file to my office upstairs," or "Move the cabinet into my office." This latter description may enable you to cease focusing on the stairs and carrying and to remember that there is an elevator nearby.

C. State the problem more generally or more broadly. Put it abstractly or even philosophically. The idea here is to find out whether the given wording of the problem is really only a specific statement of a more general problem. Often general statements allow the problem to be seen in entirely different terms and therefore suggest solutions that otherwise wouldn't be thought of.

Compare the difference in orientation: Design a better mattress, or Design a better bed, or Design a better way to sleep. The mind moves from considerations of springs and padding to the possibilities of a water bed, air flotation, maybe even an armchair design bed. How about sleeping standing up? Or in a big armchair? Or floating in a tank of water?

2. Clarify the Problem.

A. Define the key terms of the problem. (What is an X?) Use synonyms; move from genus to species or species to genus. Continue to define in more and more general or specific ways. This kind of definition allows the breaking of the problem into attributes, components, and general features. The result is to shake loose some possible solutions.

For example: Problem: Rides cost a lot to build and when people get tired of them they cost a lot to replace. Moreover, they take up a lot of space. Goal: Build a ride in a small space that's cheap and easy to replace. Definition question: What is a "ride"? It's an experience, physical, psychological, of sight, sound, motion, events. A feeling or process of going from beginning to end and seeing or experiencing things

along the way, usually exciting and different. Okay, how can we build a ride in a small space that will give this long experience of motion and movement, and that's cheap and easy to replace? Solution: Build a ride simulator. Implementation: Star Tours at Disneyland. A programmable simulator allows bumps and motion. A film creates visual effects. The simulator doesn't move laterally so it takes up little space. And when ride gets tiring, a new film and a new program of different bumps yields a new ride.

Clarify anything about the problem that is ambiguous or uncertain. Often, problems as given are unclear in their original form. "Improve the magazine," is an unclear assignment because it doesn't specify what the area of improvement should be. Does this mean choose better articles, change the typefaces and layout, get classier advertisers, get a bigger circulation, or what? "Cure condition X" might be problematic until we discover for certain whether condition X is an infectious kind of disease, a hereditary condition, a chemical poison, or what.

B. Articulate the assumptions being made about the problem and describe the way a solution would have to work. Assumptions can be tricky because they tend to be automatic and submerged--not consciously made. This articulation step in the problem solving procedure involves the conscious listing of all assumptions that can be identified. The listing is without prejudice or judgment or hostility. Just list as many as can be thought of.

It is especially important when listing assumptions to list the extremely obvious ones, because often it is those that later turn out to be alterable. Examine these assumptions to discover if they are necessary, not necessary, or uncertain as to their necessity. Many assumptions are quite necessary, of course. In the problem, Develop a better way to destroy kidney stones, one obvious and necessary assumption is that the patient should be alive after the procedure. But often assumptions turn out to be made for no good reason--that is they are not necessary assumptions. These can be challenged and new routes to success can then be discovered.

C. Obtain needed information. Research into past approaches to the problem or to similar problems will help you get new ideas as well as gain

understanding of the nature and environment of the problem itself. If your problem is to improve self-stick brackets, you might do some research into how glues work.

3. Explain the Problem.

A. Discuss the problem with someone else. Explain it carefully. Listen to your own explanation. Discussion has two important features. First, there is the possibility that you will find a solution in the head of another person. Discussion enables you to get information, suggestions, and ideas. Important: even if the ideas have nothing to do with the problem, or if they are in themselves unworkable, they can still be valuable stimuli because they will show a new approach to the problem or they will suggest something practical to you. So even though your friend can never understand your problem technically, emotionally, intellectually, artistically, or whatever, you can still gain valuable insight by discussing it and by hearing a response.

Secondly, discussing your problem with someone allows you to see what you really think. Philosophers and writing theorists have long noted that people think and work out ideas as they talk. You don't really know what you think until you consciously verbalize it. Francis Bacon noted that one value of friendship was to have someone to talk to so that you can see how your ideas look when they are turned into words. Some people have reported remarkable insights just by talking to their pets, where no intellectual feedback from the "listener" was possible. So when you discuss your problem or idea, listen to yourself as well as to the other person.

Explain why the problem is a problem. What are its negative or undesirable features? Again, a couple of functions here. One, by explaining why the problem is problematic, you discover more about its nature and whether it really is a problem. James Adams remarks that there have been a lot of solutions to problems that didn't exist. So this explanation phase allows you to discover just whether a problem is real.

Next, by explaining in detail the negatives of the problem, a set of more specific targets can be identified, thus better lending themselves to being solved.

For example, first statement: Here at the amusement park, our problem is that rides are expensive and people get tired of them. Why is this a problem?

Because we have to replace the rides so people will continue to come to the park. The negatives are that we have to (1) keep tearing the ride down, (2) building a new ride, (3) spending a lot of money, (4) disturbing the amusement park with major construction, (5) advertising the new ride, etc.

This statement allows the clarification of possible goals, like building a ride people won't tire of, figuring out a way to build rides quickly and cheaply, and so forth.

B. Look at the problem from different viewpoints. How would different people look at it? (What are the thoughts of those who cause it, those who suffer from it, those who have to fix it, those who have to pay for it, etc.?) Remember that your view of reality, as an intelligent, concerned, conscientious, middle class person, is only one view. By imaginatively taking on the viewpoints of various other people affected by a particular problem, you can sometimes discover solutions that you **as yourself** would never think of.

For example, let's say your assignment is to reduce litter on the beaches. One way to proceed would be to write out the viewpoints of various people. How do the people doing the littering view the situation? Are they thinking, "I like littering?" Or are they thinking, "I'd throw this in a can, but there isn't one nearby, so I'll toss it on the ground," or "I see that can nearby, but it smells so I don't want to go near it"? What about the person who has to pick up the trash? What are his thoughts? What about the taxpayers, or the beachgoers?

Again, suppose your job is to improve the juvenile justice system. Imagine that you are, in turn, the juvenile offender, the parents, the victim, the sheriff or arresting officer, the head of Juvenile Hall, the judge, a man on the street, and so forth. By constructing these different viewpoints, you will be able to generate solutions that meet some of the cynical, prejudiced, or even thoughtful attitudes of the various parties.

Another example. We, as users of medical services, often complain about the poor service, lack of knowledge, and high costs. What does the doctor think? He's probably worrying about getting sued. Addressing his concerns as well as our own will be the most likely way to improve the situation, rather than, say, passing

new laws based only upon our own viewpoint.

The importance of being able to see different sides or angles has been reinforced in folk wisdom worldwide. The French have a saying, for example, "To know all is to forgive all." The American Indians have the saying, "Don't criticize your neighbor until you have walked a mile in his moccasins." The better you become at understanding where others "are coming from," the better you'll become at choosing solutions that will be acceptable and effective for all involved.

C. Ask a series of clarifying whys. By asking "why" of every statement of the problem, possible solution, or identified goal, clearer definitions are made. Asking why can serve a purpose similar to that of broadening the definition of the problem, and can lead to new ways of looking at the problem and at possible solutions.

Example problem: Let's make computers smaller and lightweight and portable. Why? So people can carry them around? Why do we want people to carry them around? So they can take them on trips with them and use them, say in hotels. Why do we want them to use them on trips and in hotels? So they can make efficient use of their extra time when traveling. (Possibility: put computers in hotel rooms for guests to use.)

Example problem: We need a better way to kill mice. Why? Because we are overrun by mice and they are bothering us. Why are we overrun? Because there is food all over. Maybe we should get rid of the food. Or, maybe we should redefine the problem into, We need a better way to keep mice from bothering us. This may suggest a different solution from that of killing them, like driving them away, keeping them out of the house in the first place, etc.

Is the problem really a symptom or result of another problem? Is there a problem behind the "problem"?

For example, the "problem" of low quality cars may really be only a symptom, with the real problem behind it quite different, like poor management, low quality parts and materials, old machinery, careless labor, or whatever. A search for the causes of a problem often reveals one or more underlying problems which need to be solved first or which, when solved, will solve the originally identified problem.

4. Put the Problem in Context.

A. *What is the history of the problem?* Knowing where it came from can help focus your efforts toward a solution to try or away from a solution not to try. If a particular solution has been tried already and met with a sensational disaster, you might not want to try it first again. The problem solvers who caught Typhoid Mary eventually noticed that various families' problems with typhoid began just after Mary began to work for them.

B. *What is the problem environment?* What are the surrounding contexts? Are there associative factors that helped cause or perpetuate the problem? Have there been similar problems and solutions that may be useful in solving this one?

An understanding of contributing or perpetuating factors will help you to take steps to prevent a problem from coming right back once you solve it. Similarly, studying how similar or analogous problems have been solved may lead you to a shortcut solution to this one.

C. *List the constraints of the problem.* What limitations are imposed, what is required, what must be observed in solving the problem? This is pretty straightforward. Constraints are givens that must be followed--a budget you cannot exceed, legal or contractual requirements that must be met and so on.

For example, if your problem is to develop a new American sports car, one constraint is that it must meet federal air pollution standards. If your problem is to make an educational tour more affordable for students, one probable constraint is that the tour company can't go broke in the process.

Constraints are simply requirements to keep in mind, part of the problem's basic dimensions. Writing them down helps to keep them in the foreground as you work toward solutions. And, of course, occasionally the identified constraints turn out, upon listing and examination, not to be necessary after all. They can be eliminated or worked around.

II. Goal Establishment

1. Consider Ideal Goals. We too often set our goals as the solving of the immediate problem or the minimum solution rather than considering how we would like reality to be ideally.

For example, if Jane always criticizes everything I say, I could set as my goal that she would stop criticizing me. But what would my ideal goal be? That not only would she stop criticizing me, but she would begin to support and encourage me, and even become a partner in my efforts. Instead of the goal of reducing pollution on the beach, or even stopping it, why not a goal of an improved ecology, where the beach will be cleaner than ever before?

2. Establish Practical Goals. What are the goals to be achieved that would make this problem be declared solved? The listing of definite and precise goals is useful in problem solving because the attempts at solution can then be measured against the goals to see how much progress is being made.

Example problem: Unemployment is too high in inner city America. We want to reduce it. What will the solution look like? Goal: Reduce unemployment for both males and females over eighteen to five percent or less within the next year.

Note that setting up goals (1) helps to clarify the direction to take in solving the problem and (2) gives you something definite to aim at. What will the solution be like? That is, what will occur as a result of the solution? Describe the world as it will be after the solution is implemented.

In our unemployment example above, we could say the solution will involve setting up a permanent job finding service that will continue to operate after the goal is met, to insure that unemployment (the problem) doesn't return later on. The solution might also include educational services to train workers or to train people in job finding strategies (like looking in the paper, going to job sites, and so forth).

Note that the description of the solution here can be pretty vague and dreamy if necessary, because sometimes you will have only an uncertain notion of what that solution will ultimately be. But try to be as specific as possible. If your problem is an unhappy marriage or love relationship, you could say that your goal is "a happy relationship," but more progress toward the goal will be probable if you can be more specific, such as, "stop yelling at each other," "become more affectionate," "do more things together," and so forth.

III. Idea Generation

1. Generate Ideas for Possible Solutions.

A. Read, research, think, ask questions, discuss. Look for ideas and solutions. Begin with a period of information gathering and mental stimulation. Knowledge is power. Get facts. Learn as much as you can about the problem.

For example, suppose you are faced with the task of making a more durable conveyor belt. You might think on your own about using stronger materials, like Kevlar or steel reinforcing, but a little research would reveal how many other people have solved the same problem, and you might happen upon the idea of the Mobius strip. Here, you simply rotate one end of the belt half a turn before connecting the two ends of the belt together. This produces a belt with only one side, with twice the life of an ordinarily made belt. It's a brilliant idea that you might never come across unless you did a little research.

B. Use idea generation techniques (brainstorming, forced relationships, random stimulation, and so on). Generate a large number of ideas of all kinds so that you'll have a good selection to choose from, adapt, or stimulate other ideas. Don't worry about whether the ideas are practical or wild at this point. As we will continue to see throughout the class, some wild ideas turn out to be quite practical. Just one example: Problem: How to inhibit corrosion and increase electrical contact on electronic plugs. Solution: plate them with gold--an excellent corrosion inhibitor and conductor. That's what's often done. This "wild" solution became practical because gold can be placed on very thin, reducing the cost to something very reasonable.

C. Allow time to incubate during various phases of idea generation. The major cycle of creativity that has long been identified is **preparation** (initial thought, research, study, work), **incubation** (time to let the unconscious work), **insight** (the flash of recognition of a solution path--the eureka experience), **implementation** (working out the solution), and **evaluation**.

Small problems will require only a short period of incubation. Difficult problems will require longer periods. Some people require longer periods than other people. The main thing is to remember the cycle of work, incubate, work, incubate. The eureka flashes do not come without previous periods of preparation and hard

thinking. In the mythology of genius we often see the wizard sitting around when the flash suddenly comes to him. And that's often what happens--the insight comes during a period of relaxation. But what's left out is that same genius' long months of very hard work.

Do allow time for incubation, though. When you have worked a long time and are up against a wall, leave the problem and go out and do something relaxing. Then return to the problem. The idea of "sleeping on it" is excellent.

IV. Idea Selection

1. Evaluate the Possibilities. Evaluate the collection of ideas and possible solutions and approaches. What possible solutions, either individually or in conjunction with each other, will solve this problem? An important thing to remember here is not to get fixated on the single solution idea. You may want to adopt two or three separate solution paths at the same time--kind of like the triple antibiotic ointment approach. You might also want to set up "Plan B," a possible solution approach that can be implemented if your main plan does not work. So in your evaluation, don't focus on choosing just one solution and tossing the others away.

When you evaluate, you want to find the solution that will be the most effective (work best), efficient (cost the least, whether in terms of money, time, emotions, or whatever), and have the fewest drawbacks or side effects.

2. Choose the Solution(s).

A. *Select one or more solutions to try.* In the evaluation state above, you should establish some rank ordering. Choose from among those near the top of the list. Note that (as we will find later on in decision analysis), the very top ranked solution is not always the one to get chosen for implementation. Subjective, emotional factors, sudden changes, peculiar circumstances, the desire for beneficial side effects not directly related to the solution, intuitive feeling, and so forth, often shift the choice to something ranked below number one or two.

It's just like hiring someone or marrying someone. The person who looks best on paper may not "feel" right, and you may have a preference for someone further down the so-called objective list.

B. Allow others to see and criticize your selected solution and to make suggestions for improvements or even alternatives. The best way to turn your idea light bulb into a chandelier or floodlight is to let other people comment on it. This takes a certain amount of ego strength, since only intermediate friends will say how good the idea is. Strangers and close friends will quickly point out absurdities and weaknesses. But that's good, because you'll have a chance to improve your solution idea before attempting to implement it.

You have to walk a narrow path here. Don't be swayed too easily by criticism to change an idea that you are confident is really good; after all, the typical person is not a creative visionary and will be controlled by the prejudices of ordinariness. You can expect resistance to good new ideas. On the other hand, don't be so in love with your idea that you cannot see the legitimacy of criticisms that point out genuine weaknesses. And always be willing to incorporate new ideas and improvements from fresh minds looking at the problem and solution from a different perspective.

V. Implementation

1. Try out the solution(s). Experiment, test. "Do it, fix it, try it." "Ready, fire, aim." The real test of an idea is to try it out. The key concept here is action. Get going and begin the solution. Once you choose a solution path, get to work on it. Don't worry if objections or problems remain. Start working. Samuel Johnson noted that if all possible objections to a proposal must first be overcome, nothing would ever be attempted. And remember to give your solution sufficient time to work. Too hasty an abandonment of a solution or solution path is as common a problem as too obsessive a commitment to a particular solution path. A solution may take weeks or months (or years) to work, so use judgment in determining how long to wait before abandoning the choice.

2. Make adjustments or changes as needed during implementation.

Remain flexible in this application phase. Practically every solution needs some modification in the process of being put into effect. Blueprints are changed, scripts are rewritten, your parenting methodology is adjusted. Don't expect that your solution will be exactly as you originally proposed. Remember that the goal is to

solve the problem, not mindlessly to implement the solution exactly as proposed.

VI. Evaluation

1. Investigate to determine whether the solution(s) worked, and to what extent. Do modifications need to be made? Do other solutions need to be selected and tried? Is a different approach needed? One of the most frequent failures of problem solving is the lack of evaluation of the implemented solution. Too often in the past, once a solution has been chosen and implemented, people have wandered off, assuming that the problem was solved and everything was fine. But the solution may not have worked or not worked completely, or it may have caused other problems in the process. Staying around long enough to evaluate the solution's effectiveness, then, is an important part of problem solving.

2. Remember that many solutions are better described as partially successful or partially unsuccessful, rather than as an either/or in a success/failure division.

If you propose a solution that reduces drug addiction by even ten percent, your solution is a good one, even though it didn't work for the other ninety percent of cases. In many cases, an incomplete remedy is better than none at all.