

## 3.4 Problem Solving and Decision Making

### LEARNING OBJECTIVES

1. Learn to understand the problem.
2. Learn to combine creative thinking and critical thinking to solve problems.
3. Practice problem solving in a group.

Much of your college and professional life will be spent solving problems; some will be complex, such as deciding on a career, and require time and effort to come up with a solution. Others will be small, such as deciding what to eat for lunch, and will allow you to make a quick decision based entirely on your own experience. But, in either case, when coming up with the solution and deciding what to do, follow the same basic steps.

- **Define the problem.** Use your analytical skills. What is the real issue? Why is it a problem? What are the root causes? What kinds of outcomes or actions do you expect to generate to solve the problem? What are some of the key characteristics that will make a good choice: Timing? Resources? Availability of tools and materials? For more complex problems, it helps to actually write out the problem and the answers to these questions. Can you clarify your understanding of the problem by using metaphors to illustrate the issue?
- **Narrow the problem.** Many problems are made up of a series of smaller problems, each requiring its own solution. Can you break the problem into different facets? What aspects of the current issue are “noise” that should not be considered in the problem solution? (Use critical thinking to separate facts from opinion in this step.)
- **Generate possible solutions.** List all your options. Use your creative thinking skills in this phase. Did you come up with the second “right” answer, and the third or the fourth? Can any of these answers be combined into a stronger solution? What past or existing solutions can be adapted or combined to solve this problem?

### GROUP THINK: EFFECTIVE BRAINSTORMING

**Brainstorming** is a process of generating ideas for solutions in a group. This method is very effective because ideas from one person will trigger additional ideas from another. The following guidelines make for an effective brainstorming session:

- Decide who should moderate the session. That person may participate, but his main role is to keep the discussion flowing.
  - Define the problem to be discussed and the time you will allow to consider it.
  - Write all ideas down on a board or flip chart for all participants to see.
  - Encourage everyone to speak.
  - Do not allow criticism of ideas. *All* ideas are good during a brainstorm. Suspend disbelief until after the session. Remember a wildly impossible idea may trigger a creative and feasible solution to a problem.
- **Choose the best solution.** Use your critical thinking skills to select the most likely choices. List the pros and cons for each of your selections. How do these lists

compare with the requirements you identified when you defined the problem? If you still can't decide between options, you may want to seek further input from your brainstorming team.

## Decisions, Decisions

You will be called on to make many decisions in your life. Some will be personal, like what to major in, or whether or not to get married. Other times you will be making decisions on behalf of others at work or for a volunteer organization. Occasionally you will be asked for your opinion or experience for decisions others are making. To be effective in all of these circumstances, it is helpful to understand some principles about decision making.

First, define who is responsible for solving the problem or making the decision. In an organization, this may be someone above or below you on the organization chart but is usually the person who will be responsible for implementing the solution. Deciding on an academic major should be your decision, because *you* will have to follow the course of study. Deciding on the boundaries of a sales territory would most likely be the sales manager who supervises the territories, because he or she will be responsible for producing the results with the combined territories. Once you define who is responsible for making the decision, everyone else will fall into one of two roles: giving input, or in rare cases, approving the decision.

Understanding the role of input is very important for good decisions. Input is sought or given due to experience or expertise, but it is up to the decision maker to weigh the input and decide whether and how to use it. Input should be fact based, or if offering an opinion, it should be clearly stated as such. Finally, once input is given, the person giving the input must support the other's decision, whether or not the input is actually used.

Consider a team working on a project for a science course. The team assigns you the responsibility of analyzing and presenting a large set of complex data. Others on the team will set up the experiment to demonstrate the hypothesis, prepare the class presentation, and write the paper summarizing the results. As you face the data, you go to the team to seek input about the level of detail on the data you should consider for your analysis. The person doing the experiment setup thinks you should be very detailed, because then it will be easy to compare experiment results with the data. However, the person preparing the class presentation wants only high-level data to be considered because that will make for a clearer presentation. If there is not a clear understanding of the decision-making process, each of you may think the decision is yours to make because it influences the output of your work; there will be conflict and frustration on the team. If the decision maker is clearly defined upfront, however, and the input is thoughtfully given and considered, a good decision can be made (perhaps a creative compromise?) and the team can get behind the decision and work together to complete the project.

Finally, there is the approval role in decisions. This is very common in business decisions but often occurs in college work as well (the professor needs to approve the theme of the team project, for example). Approval decisions are usually based on availability of resources, legality, history, or policy.

## KEY TAKEAWAYS

- Effective problem solving involves critical and creative thinking.
- The four steps to effective problem solving are the following:
  1. Define the problem
  2. Narrow the problem
  3. Generate solutions
  4. Choose the solution
- Brainstorming is a good method for generating creative solutions.
- Understanding the difference between the roles of deciding and providing input makes for better decisions.

## CHECKPOINT EXERCISES

1. Gather a group of three or four friends and conduct three short brainstorming sessions (ten minutes each) to generate ideas for alternate uses for peanut butter, paper clips, and pen caps. Compare the results of the group with your own ideas. Be sure to follow the brainstorming guidelines. Did you generate more ideas in the group? Did the quality of the ideas improve? Were the group ideas more innovative? Which was more fun? Write your conclusions here.

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2. Using the steps outlined earlier for problem solving, write a plan for the following problem: You are in your second year of studies in computer animation at Jefferson Community College. You and your wife both work, and you would like to start a family in the next year or two. You want to become a video game designer and can benefit from more advanced work in programming. Should you go on to complete a four-year degree?
  - a. Define the problem: What is the core issue? What are the related issues? Are there any requirements to a successful solution? Can you come up with a metaphor to describe the issue?

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- b. Narrow the problem: Can you break down the problem into smaller manageable pieces? What would they be?

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- c. Generate solutions: What are at least two “right” answers to each of the problem pieces?

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- d. Choose the right approach: What do you already know about each solution? What do you still need to know? How can you get the information you need? Make a list of pros and cons for each solution.

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