**Thinking Critically About Problems**

Throughout your life, you are continually solving problems, including the many minor problems that you solve each day: negotiating a construction delay on the road, working through an unexpected difficulty at your job, helping an upset child deal with a disappointment. As a student, you are faced with a steady stream of academic assignments, quizzes, exams, and papers. Relatively simple problems like these do not require a systematic or complex analysis. For example, to do well on an exam, you need to *define* the problem (what areas will the exam cover, and what will be the format?), identify and evaluate various *alternatives* (what are possible study approaches?), and then put all these factors together to reach a *solution* (what will be your study plan and schedule?). But the difficult and complicated problems in life require more attention.

   Problems are the crucibles that forge the strength of our characters. When you are tested by life—forced to overcome adversity and think your way through the most challenging situations—you will emerge a more intelligent, resourceful, and resilient person. However, if you lead a sheltered existence that insulates you from life's trials, or if you flee from situations at the first sign of trouble, then you are likely to be weak and unable to cope with the eruptions and explosions that are bound to occur. Adversity reveals the person you have become, the character you have created. As the Roman philosopher and poet Lucretius explained, “So it is more useful to watch a man in times of peril, and in adversity to discern what kind of man he is; for then, at last, words of truth are drawn from the depths of his heart, and the mask is torn off, reality remains.”

   The quality of your life can be traced in large measure to your competency as a problem solver. The fact that some people are consistently superior problem solvers is largely due to their ability to approach problems in an informed and organized way. Less competent problem solvers just muddle through when it comes to confronting adversity, using hit-or-miss strategies that rarely provide the best results. How would you rate yourself as a problem solver? Do you generally approach difficulties confidently, analyze them clearly, and reach productive solutions? Or do you find that you often get “lost” and confused in such situations, unable to understand the problem clearly and to break out of mental ruts? Of course, you may find that you are very adept at solving problems in one area of your life—such as your job—and miserable at solving problems in other areas, such as your love life or your relationships with your children.

   Becoming an expert problem solver is, for the most part, a learned skill that you can develop by practicing and applying the principles described in this chapter. You can learn to view problems as*challenges,* opportunities for growth instead of obstacles or burdens. You can become a person who attacks adversity with confidence and enthusiasm.

**Introduction to Solving Problems**

Consider the following problem:

* My best friend is addicted to drugs, but he won't admit it. Jack always liked to drink, but I never thought too much about it. After all, a lot of people like to drink socially, get relaxed, and have a good time. But over the last few years he's started using other drugs as well as alcohol, and it's ruining his life. He's stopped taking classes at the college and will soon lose his job if he doesn't change. Last week I told him that I was really worried about him, but he told me that he has no drug problem and that in any case it really isn't any of my business. I just don't know what to do. I've known Jack since we were in grammar school together and he's a wonderful person. It's as if he's in the grip of some terrible force and I'm powerless to help him.

In working through this problem, the student who wrote this will have to think carefully and systematically in order to reach a solution. To think effectively in situations like this, we usually ask ourselves a series of questions:

* 1. What is the *problem*?
* 2. What are the *alternatives*?
* 3. What are the *advantages* and/or *disadvantages* of each alternative?
* 4. What is the *solution*?
* 5. How well is the solution *working*?

Let's explore these questions further—and the thinking process that they represent— by applying them to the problem described here.

**What Is the Problem?** There are a variety of ways to define the problem facing this student. Describe as specifically as possible what *you* think the problem is.

**What Are the Alternatives?** In dealing with this problem, you have a wide variety of possible actions to consider before selecting the best choices. Identify some of the alternatives you might consider. One possibility is listed already.

* 1. Speak to my friend in a candid and forceful way to convince him that he has a serious problem.
* 2.   and so on.

**What Are the Advantages and/or Disadvantages of Each Alternative?** Evaluate the strengths and weaknesses of each of the possibilities you identified so you can weigh your choices and decide on the best course of action.

* 1. Speak to my friend in a candid and forceful way to convince him that he has a serious problem. *Advantage:* He may respond to my direct emotional appeal, acknowledge that he has a problem, and seek help. *Disadvantage:* He may react angrily, further alienating me from him and making it more difficult for me to have any influence on him.
* 2.   *Advantage:* *Disadvantage:* and so on.

**What Is the Solution?** After evaluating the various alternatives, select what you think is the most effective alternative for solving the problem and describe the sequence of steps you would take to act on the alternative.

**How Well Is the Solution Working?** The final step in the process is to review the solution and decide whether it is working. If it is not, you must be able to modify your solution. Describe what results would inform you that the alternative you had selected to pursue was working well or poorly. If you concluded that your alternative was working poorly, describe what your next action would be.

   In this situation, trying to figure out the best way to help your friend recognize his problem and seek treatment requires making a series of decisions. If we understand the way our minds operate when we are thinking effectively, then we can apply this understanding to improve our thinking in new, challenging situations. In the remainder of this chapter, we will explore a more sophisticated version of this problem-solving approach and apply it to a variety of complex problems.

 **Thinking Activity 3.1**

**ANALYZING A PROBLEM YOU SOLVED**

* 1. Describe in specific detail an important problem you have solved recently.
* 2. Explain how you went about solving the problem. What were the steps, strategies, and approaches you used to understand the problem and make an informed decision?
* 3. Analyze the organization exhibited in your thinking process by completing the five-step problem-solving method we have been exploring.
* 4. Share your problem with other members of the class and have them try to analyze and solve it. Then explain the solution you arrived at.

**Solving Complex Problems**

Imagine yourself in the following situations. What would your next move be, and what are your reasons for it?

**Procrastination**

* I am a procrastinator. Whenever I have something important to do, especially if it's difficult or unpleasant, I tend to put it off. Though this chronic delaying bothers me, I try to suppress my concern and instead work on more trivial things. It doesn't matter how much time I allow for certain responsibilities, I always end up waiting until the last minute to really focus and get things done, or I overschedule too many things for the time available. I usually meet my deadlines, but not always, and I don't enjoy working under this kind of pressure. In many cases I know that I'm not producing my best work. To make matters worse, the feeling that I'm always behind causes me to feel really stressed out and undermines my confidence. I've tried every kind of schedule and technique, but my best intentions simply don't last, and I end up slipping into my old habits. I must learn to get my priorities in order and act on them in an organized way so that I can lead a well-balanced and happier life.

**Losing Weight**

* My problem is the unwelcome weight that has attached itself to me. I was always in pretty good physical shape when I was younger, and if I gained a few extra pounds, they were easy to lose if I adjusted my diet slightly or exercised a little more. As I've gotten older, however, it seems easier to add the weight and more difficult to take it off. I'm eating healthier than I ever have before and getting just as much exercise, but the pounds just keep on coming. My clothes are tight, I'm feeling slow and heavy, and my self-esteem is suffering. How can I lose this excess poundage?

**Smoking**

* One problem in my life that has remained unsolved for about twelve years is my inability to stop smoking. I know it is dangerous for my health, and I tell my children that they should not smoke. They then tell me that I should stop, and I explain to them that it is very hard to do. I have tried to stop many times without success. The only times I previously was able to stop were during my two pregnancies because I didn't want to endanger my children's health. But after their births, I went back to smoking, although I realize that secondhand smoke can also pose a health hazard. I want to stop smoking because it's dangerous, but I also enjoy it. Why do I continue, knowing it can only damage me and my children?

**Loss of Financial Aid**

* I'm just about to begin my second year of college, following a very successful first year. To this point, I have financed my education through a combination of savings, financial aid, and a part-time job (sixteen hours per week) at a local store. However, I just received a letter from my college stating that it was reducing my financial aid package by half due to budgetary problems. The letter concludes, “We hope this aid reduction will not prove to be too great an inconvenience.” From my perspective, this reduction in aid isn't an inconvenience— it's a disaster! My budget last year was already tight, and with my job, I had barely enough time to study, participate in a few college activities, and have a modest (but essential) social life. To make matters worse, my mother has been ill, a condition that has reduced her income and created financial problems at home. I'm feeling panicked! What in the world am I going to do?

**Thinking Critically About Visuals**

**“Eureka! I have created something never seen before!”**

This photograph of Steve Jobs introducing the iPad to the world for the first time is a stunning image. In what ways was the iPad a completely unique creation? Studying the photograph, how do you think Steve Jobs feels at this moment? Why do people usually settle for conventional alternatives when trying to solve problems, rather than pushing for truly innovative ideas? Describe a time when you were able to solve a difficult problem by using a genuinely creative solution. How did this experience make you feel?

   When we first approach a difficult problem, it often seems a confused tangle of information, feelings, alternatives, opinions, considerations, and risks. The problem of the college student just described is a complicated situation that does not seem to offer a single simple solution. Without the benefit of a systematic approach, our thoughts might wander through the tangle of issues like this:

* I want to stay in school… but I'm not going to have enough money … I could work more hours at my job… but I might not have enough time to study and get top grades… and if all I'm doing is working and studying, what about my social life? … and what about Mom and the kids? … They might need my help … I could drop out of school for a while … but if I don't stay in school, what kind of future do I have?…

   Very often when we are faced with difficult problems like this, we simply do not know where to begin trying to solve them. Frustrated by not knowing where to take the first step, we often give up trying to understand the problem. Instead, we may

* 1. *Act impulsively* without thought or consideration (e.g., “I'll just quit school”).
* 2. *Do what someone else suggests* without seriously evaluating the suggestion (e.g., “Tell me what I should do—I'm tired of thinking about this”).
* 3. *Do nothing* as we wait for events to make the decision for us (e.g., “I'll just wait and see what happens before doing anything”).

None of these approaches is likely to succeed in the long run, and they can gradually reduce our confidence in dealing with complex problems. An alternative to these reactions is to *think critically*about the problem, analyzing it with an organized approach based on the five-step method described earlier.

   Although we will be using an organized method for working through difficult problems and arriving at thoughtful conclusions, the fact is that our minds do not always work in such a logical, step-by-step fashion. Effective problem solvers typically pass through all the steps we will be examining, but they don't always do so in the sequence we will be describing. Instead, the best problem solvers have an integrated and flexible approach to the process in which they deploy a repertoire of problem-solving strategies as needed. Sometimes exploring the various alternatives helps them go back and redefine the original problem; similarly, seeking to implement the solution can often suggest new alternatives.

   The key point is that, although the problem-solving steps are presented in a logical sequence here, you are not locked into following these steps in a mechanical and unimaginative way. At the same time, in learning a problem-solving method like this, it is generally not wise to skip steps because each step deals with an important aspect of the problem. As you become more proficient in using the method, you will find that you can apply its concepts and strategies to problem solving in an increasingly flexible and natural fashion, just as learning the basics of an activity like driving a car gradually gives way to a more organic and integrated performance of the skills involved.

   Before applying a method like the one just outlined above to your problem, however, you first need to prepare yourself by *accepting* the problem.

**ACCEPTING THE PROBLEM**

To solve a problem, you must first be willing to *accept* the problem by *acknowledging* that the problem exists, *identifying* the problem, and *committing* yourself to trying to solve it.

   Successful problem solvers are highly motivated and willing to persevere through the many challenges and frustrations of the problem-solving process. How do you find the motivation and commitment that prepare you to enter the problem-solving process? There are no simple answers, but a number of strategies may be useful to you:

* 1. ***List the benefits.*** Make a detailed list of the benefits you will derive from successfully dealing with the problem. Such a process helps you clarify why you might want to tackle the problem, motivates you to get started, and serves as a source of encouragement when you encounter difficulties or lose momentum.
* 2. ***Formalize your acceptance.*** When you formalize your acceptance of a problem, you are “going on record,” either by preparing a signed declaration or by signing a “contract” with someone else. This formal commitment serves as an explicit statement of your original intentions that you can refer to if your resolve weakens.

**Problem-Solving Method (Advanced)**

* + **Step 1:** What is the problem?
		- a. What do I know about the situation?
		- b. What results am I aiming for in this situation?
		- c. How can I define the problem?
	+ **Step 2:** What are the alternatives?
		- a. What are the boundaries of the problem situation?
		- b. What alternatives are possible within these boundaries?
	+ **Step 3:** What are the advantages and/or disadvantages of each alternative?
		- a. What are the advantages of each alternative?
		- b. What are the disadvantages of each alternative?
		- c. What additional information do I need to evaluate each alternative?
	+ **Step 4:** What is the solution?
		- a. Which alternative(s) will I pursue?
		- b. What steps can I take to act on the alternative(s) chosen?
	+ **Step 5:** How well is the solution working?
		- a. What is my evaluation?
		- b. What adjustments are necessary?
* 3. ***Accept responsibility for your life.*** Each of us has the potential to control the direction of our lives, but to do so we must accept our freedom to choose and the responsibility that goes with it. As you saw in the last chapter, critical thinkers actively work to take charge of their lives rather than letting themselves be passively controlled by external forces.
* 4. ***Create a “worst-case” scenario.*** Some problems persist because you are able to ignore their possible implications. When you use this strategy, you remind yourself, as graphically as possible, of the potentially disastrous consequences of your actions. For example, using vivid color photographs and research conclusions, you can remind yourself that excessive smoking, drinking, or eating can lead to myriad health problems and social and psychological difficulties as well as an early demise.
* 5. ***Identify what's holding you back.*** If you are having difficulty accepting a problem, it is usually because something is holding you back. Whatever the constraints, using this strategy involves identifying and describing all of the factors that are preventing you from attacking the problem and then addressing these factors one at a time.

**STEP 1: WHAT IS THE PROBLEM?**

Once you have accepted the problem, the first step in solving a problem is to determine exactly what the central issues of the problem are. If you do not clearly understand what the problem really is, then your chances of solving it are considerably reduced. For example, consider the different formulations of the following problems.

|  |  |  |
| --- | --- | --- |
| “School is boring.” | versus | “I feel bored in school.” |
| “I'm a failure.” | versus | “I just failed an exam.” |

In each of these cases, a very general conclusion (left column) has been replaced by a more specific characterization of the problem (right column). The general conclusions (e.g., “I'm a failure”) do not suggest productive ways of resolving the difficulties. On the other hand, the more specific descriptions of the problem situation (e.g., “I just failed an exam”) *do* permit us to attack the problem with useful strategies. Correct identification of a problem is essential if you are going to perform a successful analysis and reach an appropriate conclusion.

   Let us return to the college finances problem we encountered on pages 109–110 and analyze it using our problem-solving method. (*Note:* As you work through this problem-solving approach, apply the steps and strategies to an unsolved problem in your own life. You will have an opportunity to write your analysis when you complete Thinking Activity 3.2 on page 124.) To complete the first major step of this problem-solving approach—“What is the problem?”—address these three questions:

* 1. What do I know about the situation?
* 2. What results am I aiming for in this situation?
* 3. How can I define the problem?

**Step 1A: What Do I Know About the Situation?** Solving a problem begins with determining what information you *know* to be the case and what information you *think* might be the case. You need to have a clear idea of the details of your beginning circumstances to explore the problem successfully.

   You can identify and organize what you know about the problem situation by using *key questions.* In [**Chapter 2**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch2), we examined six types of questions that can be used to explore situations and issues: *fact, interpretation, analysis, synthesis, evaluation,* and *application.* By asking—and trying to answer—questions of fact, you are establishing a sound foundation for the exploration of your problem. Answer the following questions of fact—who, what, where, when, how, why—about the problem described at the beginning of the chapter on page 107.

* 1. *Who* are the people involved in this situation? *Who* will benefit from solving this problem? *Who* can help me solve this problem?
* 2. *What* are the various parts or dimensions of the problem? *What* are my strengths and resources for solving this problem? *What* additional information do I need to solve this problem?
* 3. *Where* can I find people or additional information to help me solve the problem?
* 4. *When* did the problem begin? *When* should the problem be resolved?
* 5. *How* did the problem develop or come into being?
* 6. *Why* is solving this problem important to me? *Why* is this problem difficult to solve?
* 7. Additional questions:

**Step 1B: What Results Am I Aiming for in This Situation?** The second part of answering the question “What is the problem?” consists of identifying the specific *results* or goals you are trying to achieve, encouraging you to look ahead to the future. The results are those goals whose achievement will eliminate the problem. In this respect, it is similar to the process of establishing and working toward your goals that you examined in [**Chapter 1**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch1). To identify your results, ask yourself: “What are the objectives that, once achieved, will solve this problem?” For instance, one of the results or objectives in the sample problem is having enough money to pay for college. Describe additional results you might be trying to achieve in this situation.

**Step 1C: How Can I Define the Problem?** Conclude Step 1 by defining the problem as clearly and specifically as possible. Defining the problem is a crucial task in the entire problem-solving process because this definition determines the direction of the analysis. To define the problem, you need to identify its central issue(s). Sometimes defining the problem is relatively straightforward, such as: “Trying to find enough time to exercise.” Often, however, identifying the central issue of a problem is a complex process. In fact, you may only begin to develop a clear idea of the problem as you engage in the process of trying to solve it. For example, you might begin by believing that your problem is, say, not having the *ability* to succeed, and end by concluding that the problem is really a*fear* of success.

   Although there are no simple formulas for defining challenging problems, you can pursue several strategies in identifying the central issue most effectively:

* 1. ***View the problem from different perspectives.*** As you saw in [**Chapter 2**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch2), perspective-taking is a key ingredient of thinking critically, and it can help you zero in on many problems as well. In the college finances problem, how would you describe the following perspectives? *Your perspective:* *The college's perspective:* *Your parents' perspective:*
* 2. ***Identify component problems.*** Larger problems are often composed of component problems. To define the larger problem, it is often necessary to identify and describe the subproblems that comprise it. For example, poor performance at school might be the result of a number of factors, such as ineffective study habits, inefficient time management, and preoccupation with a personal problem. Defining, and dealing effectively with, the larger problem means defining and dealing with the subproblems first. Identify possible subproblems in the sample problem: *Subproblem a:* *Subproblem b:*
* 3. ***State the problem clearly and specifically.*** A third defining strategy is to state the problem as clearly and specifically as possible, based on an examination of the results that need to be achieved to solve the problem. If you state the problem in very *general* terms, you won't have a clear idea of how best to proceed in dealing with it. But if you can describe your problem in more *specific* terms, then your description will begin to suggest actions you can take to solve the problem. Examine the differences between the statements of the following problem: *General:* “My problem is money.” *More specific:* “My problem is budgeting my money so that I won't always run out near the end of the month.” *Most specific:* “My problem is developing the habit and the discipline to budget my money so that I won't always run out near the end of the month.” Review your analysis of the sample problem and then define the problem as clearly and specifically as possible.

**STEP 2: WHAT ARE THE ALTERNATIVES?**

Once you have identified your problem clearly and specifically your next move is to examine the possible actions that might help you solve the problem. Before you list the alternatives, determine first which actions are possible and which are impossible. You can do this by exploring the*boundaries* of the problem situation.

**Step 2A: What Are the Boundaries of the Problem Situation?** Boundaries are the limits in the problem situation that you cannot change. They are part of the problem, and they must be accepted and dealt with. At the same time, you must be careful not to identify as boundaries circumstances that can actually be changed. For instance, in the sample problem, you might assume that your problem must be solved in your current location without realizing that relocating to another, less expensive college is one of your options. Identify additional boundaries that might be part of the sample situation and some of the questions you would want to answer regarding these boundaries.

**Step 2B: What Alternatives Are Possible Within These Boundaries?** After you have established a general idea of the boundaries of the problem situation, identify the courses of action possible within these boundaries. Of course, identifying all the possible alternatives is not always easy; in fact, it may be part of your problem. Often we do not see a way out of a problem because our thinking is fixed in certain perspectives. This is an opportunity for you to make use of your creative thinking abilities. When people approach problems, they generally focus on the two or three obvious possibilities and then keep churning these around. Instead, a much more productive approach is to try to come up with ten, fifteen, or twenty alternatives, encouraging yourself to go beyond the obvious. In truth, the most inventive and insightful alternative is much more likely to be alternative number 17 or number 26 than it is number 2 or number 4. You can use several strategies to help you break out of conventional patterns of thought and encourage you to generate a full range of innovative possibilities:

* 1. ***Discuss the problem with other people.*** Discussing possible alternatives with others uses a number of the aspects of critical thinking you explored in [**Chapter 2**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch2), such as being open to seeing situations from different viewpoints and discussing your ideas with others in an organized way. As critical thinkers we live—and solve problems—in a community. Other people can often suggest possible alternatives that we haven't thought of, in part because they are outside the situation and thus have a more objective perspective, and in part because they view the world differently than we do, based on their past experiences and their personalities. In addition, discussions are often creative experiences that generate ideas. The dynamics of these interactions often lead to ideas and solutions that are greater than the individual “sum” of those involved.
* 2. ***Brainstorm ideas.*** Brainstorming builds on the strengths of working with other people to generate ideas and solve problems. In a typical brainstorming session, a group of people work together to generate as many ideas as possible in a specific period of time. Ideas are not judged or evaluated because this tends to inhibit the free flow of ideas and discourages people from making suggestions. Evaluation is deferred until a later stage. A useful visual adjunct to brainstorming is creating mind maps, a process described in[**Chapter 7**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch7), “Forming and Applying Concepts.”
* 3. ***Change your location.*** Your perspective on a problem is often tied to its location. Sometimes you need a fresh perspective; getting away from the location of the problem situation lets you view it with more clarity.

Using these strategies, identify alternatives to help solve the sample problem.

**Thinking Critically About Visuals**

**“Necessity Is the Mother of Invention”**

This photo is of a windmill designed and built by William Kamkwamba in 2003 in Masitala, a village in Malawi, Africa, for the purpose of generating power for his parents' home. At the time, Kamkwamba was just a teenager, and he researched and taught himself how to build the windmill all on his own using local scrap materials that he could find. This vividly illustrates the point that creative problem solving is both innovative and useful in a practical way, and that it often makes use of available materials—whatever they are—thus underscoring the wisdom of the statement “Necessity is the mother of invention.” What other examples of creative innovation have you run into in the course of everyday life?

**STEP 3: WHAT ARE THE ADVANTAGES AND/OR DISADVANTAGES OF EACH ALTERNATIVE?**

Once you have identified the various alternatives, your next step is to *evaluate* them by using the evaluation questions described in [**Chapter 2**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch2). Each possible course of action has certain advantages, in the sense that if you select that alternative, there will be some positive results. At the same time, each of the possible courses of action likely has disadvantages, because selecting that alternative may involve a cost or a risk of negative results. Examine the potential advantages and/or disadvantages in order to determine how helpful each course of action would be.

**Thinking Critically About Visuals**

**“I Have a Creative Idea!”**

Most problems have more than one possible solution, and to discover the most creative ideas, we need to go beyond the obvious. Imagine that you are faced with the challenge of designing an enclosure that would protect an egg from breaking when dropped from a three-story building; then describe your own creative solution for this challenge. Where did your creative idea come from? How does it compare with the solutions of other students in your class?

**Step 3A: What Are the Advantages of Each Alternative?** One alternative you may have listed in Step 2 for the sample problem might include the following advantages:

|  |  |
| --- | --- |
| *Alternative* | *Advantages* |
| Attend college part-time | This would remove some of the immediate time and money pressures I am experiencing while still allowing me to prepare for the future. I would have more time to focus on the courses that I am taking and to work additional hours. |

Identify the advantages of each of the alternatives that you listed in Step 2. Be sure that your responses are thoughtful and specific.

**Step 3B: What Are the Disadvantages of Each Alternative?** You also need to consider the disadvantages of each alternative. The alternative you listed for the sample problem might include the following disadvantages:

|  |  |
| --- | --- |
| *Alternatives* | *Disadvantages* |
| Attend college part-time | It would take me much longer to complete my schooling, thus delaying my progress toward my goals. Also, I might lose motivation and drop out before completing school because the process would be taking so long. Being a part-time student might even threaten my eligibility for financial aid. |

Now identify the disadvantages of each of the alternatives that you listed. Be sure that your responses are thoughtful and specific.

**Step 3C: What Additional Information Do I Need to Evaluate Each Alternative?** Determine what you must know (*information needed*) to evaluate and compare the alternatives. In addition, you need to figure out the best places to get this information (*sources*).

   To identify the information you need, ask yourself the question “*What if I* select this alternative?” For instance, one alternative in the sample problem was “Attend college part-time.” When you ask yourself the question “*What if* I attend college part-time?” you are trying to predict what will occur if you select this course of action. To make these predictions, you must find the information to answer certain questions:

* • How long will it take me to complete my schooling?
* • How long can I continue in school without losing interest and dropping out?
* • Will I threaten my eligibility for financial aid if I become a part-time student?

Possible sources for this information include the following: myself, other part-time students, school counselors, the financial aid office.

   Identify the information needed and the sources of this information for each of the alternatives that you identified. Be sure that your responses are thoughtful and specific.

**STEP 4: WHAT IS THE SOLUTION?**

The purpose of Steps 1 through 3 is to analyze your problem in a systematic and detailed fashion—to work through the problem in order to become thoroughly familiar with it and the possible solutions to it. Once the problem is broken down in this way, the final step should be to try to put the pieces back together—that is, to decide on a thoughtful course of action based on your increased understanding. Even though this sort of problem analysis does not guarantee finding a specific solution to the problem, it should *deepen your understanding* of exactly what the problem is about. And in locating and evaluating your alternatives, it should give you some very good ideas about the general direction you should move in and the immediate steps you should take.

**Step 4A: Which Alternative(s) Will I Pursue?** There is no simple formula or recipe to tell you which alternatives to select. As you work through the different courses of action that are possible, you may find that you can immediately rule some out. For example, in the sample problem, you may know with certainty that you do not want to attend college part-time (alternative 1) because you will forfeit your remaining financial aid. However, it may not be so simple to select which of the other alternatives you wish to pursue. How do you decide?

   The decisions we make usually depend on what we believe to be most important to us. These beliefs regarding what is most important to us are known as *values.* Our values are the starting points of our actions and strongly influence our decisions. Our values help us *set priorities* in life. We might decide that, for the present, going to school is more important than having an active social life. In this case, going to school is a higher priority than having an active social life. Unfortunately, our values are not always consistent with each other—we may have to choose *either*to go to school or to have an active social life. Both activities may be important to us; they are simply not compatible with each other. Very often the *conflicts* between our values constitute the problem. Let's examine some strategies for selecting alternatives that might help us solve the problem.

* 1. ***Evaluate and compare alternatives.*** Although each alternative may have certain advantages and disadvantages, not all advantages are equally desirable or potentially effective. Thus it makes sense to evaluate and rank the various alternatives based on how effective they are likely to be and how they match up with your value system. A good place to begin is the “Results” stage, Step 1B. Examine each of the alternatives and evaluate how well it will contribute to achieving the results you are aiming for. Rank the alternatives or develop your own rating system to assess their relative effectiveness.

**Thinking Critically About Visuals**

**“Why Didn't I Think of That?”**

Many creative ideas—Like Post-it Notes—seem obvious *after* they have been invented. The essence of creativity is thinking of innovative ideas *before* others do. Recall a time in your life when you were able to use your thinking abilities to come up with a creative solution to a problem, and share your creative solution with your classmates. Where do you think your creative idea came from?

   After evaluating the alternatives in terms of their anticipated *effectiveness,* the next step is to evaluate them in terms of their *desirability,* based on your needs, interests, and value system. After completing these two separate evaluations, select the alternative(s) that seem most appropriate. Review the alternatives you identified in the sample problem and then rank or rate them according to their potential effectiveness and desirability.

* 2. ***Combine alternatives.*** After reviewing and evaluating the alternatives, you may develop a new alternative that combines the best qualities of several options while avoiding their disadvantages. In the sample problem, you might combine attending college part-time during the academic year with attending school during the summer session so that progress toward your degree won't be impeded. Examine the alternatives you identified and develop a new option that combines their best elements.
* 3. ***Try out each alternative in your imagination.*** Focus on each alternative and try to imagine, as concretely as possible, what it would be like if you actually selected it. Visualize what impact your choice would have on your problem and what the implications would be for your life as a whole. By trying out the alternative in your imagination, you can sometimes avoid unpleasant results or unexpected consequences. As a variation of this strategy, you can sometimes test alternatives on a very limited basis in a practice situation. For example, if you are trying to overcome your fear of speaking in groups, you can practice various speaking techniques with your friends or family until you find an approach you are comfortable with.

After trying out these strategies on the sample problem, select the alternative(s) you think would be most effective and desirable.

**Step 4B: What Steps Can I Take to Act on the Alternative(s) Chosen?** Once you have decided on the correct alternative(s) to pursue, your next move is to *take action* by planning specific steps. In the sample problem, for example, imagine that one of the alternatives you have selected is “Find additional sources of income that will enable me to work part-time and go to school full-time.” The specific steps you could take might include the following:

* 1. Contact the financial aid office at the school to see what other forms of financial aid are available and what you have to do to apply for them.
* 2. Contact some of the local banks to see what sorts of student loans are available.
* 3. Look for a higher-paying job so that you can earn more money without working additional hours.
* 4. Discuss the problem with students in similar circumstances in order to generate new ideas.

Identify the steps you would have to take in pursuing the alternative(s) you identified on pages 120–122.

   Once you know what actions you have to take, you need to commit yourself to taking the necessary steps. This is where many people stumble in the problem-solving process, paralyzed by inertia or fear. Sometimes, to overcome these blocks and inhibitions, you need to reexamine your original acceptance of the problem, perhaps making use of some of the strategies you explored on pages 112–113. Once you get started, the rewards of actively attacking your problem are often enough incentive to keep you focused and motivated.

**STEP 5: HOW WELL IS THE SOLUTION WORKING?**

Any analysis of a problem situation, no matter how careful and systematic, is ultimately limited. You simply cannot anticipate or predict everything that is going to happen in the future. As a result, every decision you make is provisional, in the sense that your ongoing experience will inform you if your decisions are working out or if they need to be changed and modified. As you saw in[**Chapter 2**](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch2), this is precisely the attitude of the critical thinker—someone who is *receptive* to new ideas and experiences and *flexible* enough to change or modify beliefs based on new information. Critical thinking is not a compulsion to find the “right” answer or make the “correct” decision; it is an ongoing process of exploration and discovery.

**Step 5A: What Is My Evaluation?** In many cases the relative effectiveness of your efforts will be apparent. In other cases it will be helpful to pursue a more systematic evaluation.

* 1. ***Compare the results with the goals.*** Compare the anticipated results of the alternative(s) you selected. To what extent will your choice(s) meet your goals? Are there goals that are not likely to be met by your alternative(s)? Which ones? Could they be addressed by other alternatives? Asking these and other questions will help you clarify the success of your efforts and provide a foundation for future decisions.
* 2. ***Get other perspectives.*** As you have seen throughout the problem-solving process, getting the opinions of others is a productive strategy at almost every stage, and this is certainly true for evaluation. It is not always easy to receive the evaluations of others, but maintaining open-mindedness toward outside opinions will stimulate and guide you to produce your best efforts.    To receive specific, practical feedback from others, ask specific, practical questions that will elicit this information. General questions (“What do you think of this?”) typically result in overly general, unhelpful responses (“It sounds okay to me”). Be focused in soliciting feedback, and remember: You do have the right to ask people to be *constructive* in their comments, providing suggestions for improvement rather than flatly expressing what they think is wrong.

**Step 5B: What Adjustments Are Necessary?** As a result of your review, you may discover that the alternative you selected is not feasible or is not leading to satisfactory results. At other times you may find that the alternative you selected is working out fairly well but still requires some adjustments as you continue to work toward your desired outcomes. In fact, this is a typical situation. Even when things initially appear to be working reasonably well, an active thinker continues to ask questions such as “What might I have overlooked?” and “How could I have done this differently?” Of course, asking—and trying to answer—questions like these is even more essential if solutions are hard to come by (as they usually are in real-world problems) and if you are to retain the flexibility and optimism you will need to tackle a new option.

 **Thinking Activity 3.2**

**ANALYZING AN UNSOLVED PROBLEM**

Select a problem from your own life. It should be one that you are currently grappling with and have not yet been able to solve. After selecting the problem you want to work on, strengthen your acceptance of the problem by using one or more of the strategies described on pages 112–113 and describing your efforts. Then analyze your problem using the problem-solving method described in this chapter. Discuss your problem with other class members to generate fresh perspectives and unusual alternatives that might not have occurred to you. Write your analysis in outline style, giving specific responses to the questions in each step of the problem-solving method. Although you might not reach a “guaranteed” solution to your problem, you should deepen your understanding of the problem and develop a concrete plan of action that will help you move in the right direction. Implement your plan of action and then monitor the results.

 **Thinking Activity 3.3**

**ANALYZING COLLEGE PROBLEMS**

Analyze the following problems using the problem-solving approach presented in this chapter.

**Problem 1: Declaring a Major**

The most important unsolved problem that exists for me is my inability to make that crucial decision of what to major in. I want to be secure with respect to both money and happiness when I make a career for myself, and I don't want to make a mistake in choosing a field of study. I want to make this decision before beginning the next semester so that I can start immediately in my career. I've been thinking about managerial studies. However, I often wonder if I have the capacity to make executive decisions when I can't even decide on what I want to do with my life.

**Problem 2: Taking Tests**

One of my problems is my difficulty in taking tests. It's not that I don't study. What happens is that when I get the test, I become nervous and my mind goes blank. For example, in my art history class, the teacher told the class a week in advance about an upcoming test. That afternoon I went home and began studying for the test. By the day of the test I thought I knew all of the material, but when the teacher began the test by showing slides of art pieces we were to identify, I became nervous and my mind went blank. I ended up failing it.

**Problem 3: Learning English**

One of the serious problems in my life is learning English as a second language. It is not so easy to learn a second language, especially when you live in an environment where only your native language is spoken. When I came to this country three years ago, I could speak almost no English. I have learned a lot, but my lack of fluency is getting in the way of my studies and my ability to do as well as I am capable of doing.

**Solving Nonpersonal Problems**

The problems we have analyzed up to this point have been “personal” problems in the sense that they represent individual challenges encountered by us as we live our lives. We also face problems as members of a community, a society, and the world. As with personal problems, we need to approach these kinds of problems in an organized and thoughtful way in order to explore the issues, develop a clear understanding, and decide on an informed plan of action.

   Making sense of a complex, challenging situation is not a simple process. Although the problem-solving method we have been using in this chapter is a powerful approach, its successful application depends on having sufficient information about the situation we are trying to solve. As a result, it is often necessary for us to research articles and other sources of information to develop informed opinions.

   The famous newspaper journalist H. L. Mencken once said, “To every complex question there is a simple answer—and it's clever, neat, and wrong!” Complex problems do not admit simple solutions, whether they concern personal problems in our lives or larger social problems like racial prejudice or world hunger. However, we should have the confidence that by working through these complex problems thoughtfully and systematically, we can achieve a deeper understanding of their many interacting elements as well as develop strategies for solving them.

   Becoming an effective problem solver does not merely involve applying a problem-solving method in a mechanical fashion any more than becoming a mature critical thinker involves mastering a set of thinking skills. Rather, solving problems, like thinking critically, reflects a total approach to making sense of experience. When we think like problem solvers, we have the courage to meet difficult problems head-on and the determination to work through them. Instead of acting impulsively or relying exclusively on the advice of others, we are able to make sense of complex problems in an organized way and develop practical solutions and initiatives.

   A sophisticated problem solver employs all of the critical-thinking abilities that we have examined so far and those we will explore in the chapters ahead. And while we might agree with H. L. Mencken's evaluation of simple answers to complex questions, we might endorse a rephrased version: “To many complex questions there are complex answers—and these are worth pursuing!”

 **Thinking Activity 3.4**

**ANALYZING SOCIAL PROBLEMS**

Identify an important local, national, or international problem that needs to be solved. Locate two or more articles that provide background information and analysis of the problem. Using these articles as a resource, analyze the problem using the problem-solving method developed in this chapter.

**Thinking Critically About Visuals**

**Advertising to Change Behavior**

These ads are part of a campaign to eradicate the increasingly serious problem of people texting while they drive, a practice that often leads to accidents and sometimes fatalities. What is your reaction to each of these ads: do you think they would be effective in discouraging people to text while driving? The first ad makes the arresting claim that texting is equivalent to murder and is accompanied with a graphic photo. Do you agree with this claim? Why or why not? What is the flaw in people's thinking that enables them to engage in dangerous or self-destructive behaviors while ignoring the potential consequences of these actions?

Examine the second ad carefully. In what ways is the approach it takes different than that of the first ad? Do you find it to be more or less effective? Why? The approach of this ad is to replicate the often random and unfocused thinking process that often precedes an accident. Do you think this is an accurate portrayal of what actually takes place in people's minds when they are texting and driving?

   We can analyze texting and driving as a problem to be solved. Go back to the five steps (page 107) for thinking effectively about a problem. At which step would ads like these be helpful, and why? Conversely, would these ads perhaps not be effective in solving this problem? Why not? Imagine that you are a member of an advertising company hired to create an ad to attack this problem. What kind of ad would you create? Why? If time permits, your teacher may give you and your classmates an opportunity to work in small groups to actually create such an ad.

 **THINKING CRITICALLY ABOUT NEW MEDIA**

**Surfing Dangers and Addictions**

Using the power and opportunities afforded by new media is intoxicating—but it is also potentially problematic. In the last chapter we explored the difficulties we can encounter when dealing with others on the Net. But you may encounter threats and challenges just by virtue of spending a lot of time online. These threats and challenges can be dealt with effectively if we take an informed, problem-solving approach, but we first have to be aware of what the dangers are.

   To begin with, using the various aspects of new media can be addictive in the same way that watching television can be addictive. For example, have you ever found yourself “hypnotized” by the television, watching shows that you're not even that interested in? There are a variety of visual and psychological reasons why if's so difficult to stop watching television, many of which apply to the computer screen as well. Unlike real life, where we take in a tiny part of the visual panorama around us with the fovea (the sharp-focusing part of the eye), when we watch television we take in the entire frame of the image with our sharp foveal vision, making the experience more visually fascinating. Similarly, again in contrast to real life, the images on the screen are dynamic and almost always moving, creating an attention-grabbing bond that is difficult to tear ourselves away from. This continual eye movement as we watch activity on screens also causes the eye to defocus slightly, a physiological activity that typically accompanies various fantasy, daydreaming, and drug-induced states. As Marie Winn, in her seminal work *The Plug-In Drug,* observes: “This may very well be a reason for the trancelike nature of so many viewers' television experience, and may help to explain why the television image has so strong and hypnotic a fascination.”

   These same factors are at work whether we are watching a television screen or a computer screen. The difference is that new media are *interactive*: we can roam around the Net at will, follow an infinite succession of links and websites, and communicate with as many people as we wish to. It's no wonder that once we start our fingertips moving on the computer or communication device we're using, it's very difficult to get those fingers to stop. Although a certain amount of the time we spend engaged with new media is productive, much of it is not particularly useful, and it prevents us from engaging in other activities that *would* be more enriching and productive.

   As with any addiction, seeking a solution involves recognizing that there *is* a problem and then using a problem-solving methodology like the one introduced in this chapter. Certainly a good place to begin is by strictly scheduling and limiting the time we spend “surfing” online or engaged in social exchanges. This is particularly true when it comes to email and text messaging. And if we're engaged in a real-world activity, it's useful to discipline ourselves by checking for messages every hour or so rather than reading and responding to them as they come in. Research has shown that leaving and then returning to the activity in which you were engaged is a tremendous time-waster.

   A more subtle threat to our well-being is described in the article on page 130, “Is Google Making Us Stupid?” in which the author, Nicholas Carr, explores whether our immersion in new media is restructuring the way we think and process information, making it more difficult for us to concentrate on activities like reading for a lengthy period of time, spending time in quiet contemplation of important issues, or thinking in deep and complex ways. As Carr, a writer, explains: “Once I was a scuba diver in the sea of words. Now I zip along the surface like a guy on a Jet Ski.”

 **Thinking Activity 3.5**

**READING PRINT VS. READING ONLINE**

In anticipation of reading the following article, “Is Google Making Us Stupid?” perform the following reading “experiment” to explore the differences between print and online reading. Select a news source that has both a print version and an online version such as *The New York Times, Washington Post, Chicago Tribune,* or *The Los Angeles Times.*

   First read the online version, selecting and reading the articles of interest as you normally would. Then read the print version of the same publication but on a different date. What differences did you find between the two experiences? For example, did you find that

* • you spent more time reading one of the versions?
* • one version provided you with the more detailed and developed information?
* • one version exposed you to a greater variety of topics and stories?
* • one version more deeply engaged you in the process of reading and thinking?
* • One version resulted in a greater recall of what you had read?

After responding to these questions, analyze what factors accounted for the different experiences.

**Thinking Passage**

**THE INFLUENCE OF NEW MEDIA**

In the following provocative article, “Is Google Making Us Stupid?” the writer Nicholas Carr wonders if the culture's pervasive use of the Web-based new media is restructuring the way that we think, making it more difficult for us to concentrate, contemplate, and read lengthy, complex books and articles. The author's concern is that using the Web encourages us to jump quickly from link to link, spending little time at any one particular place to think deeply and analytically about the ideas we are considering. Is this a problem about which we ought to be concerned? After carefully reading and thinking about the article, answer the questions that follow.

***Is Google Making Us Stupid?***

**by Nicholas Carr**

“Dave, stop. Stop, will you? Stop, Dave. Will you stop, Dave?” So the supercomputer HAL pleads with the implacable astronaut Dave Bowman in a famous and weirdly poignant scene toward the end of Stanley Kubrick's *2001: A Space Odyssey.* Bowman, having nearly been sent to a deep-space death by the malfunctioning machine, is calmly, coldly disconnecting the memory circuits that control its artificial “brain.” “Dave, my mind is going,” HAL says, forlornly. “I can feel it. I can feel it.”

   I can feel it, too. Over the past few years I've had an uncomfortable sense that someone, or something, has been tinkering with my brain, remapping the neural circuitry, reprogramming the memory. My mind isn't going—so far as I can tell—but it's changing. I'm not thinking the way I used to think. I can feel it most strongly when I'm reading. Immersing myself in a book or a lengthy article used to be easy. My mind would get caught up in the narrative or the turns of the argument, and I'd spend hours strolling through long stretches of prose. That's rarely the case anymore. Now my concentration often starts to drift after two or three pages. I get fidgety, lose the thread, begin looking for something else to do. I feel as if I'm always dragging my wayward brain back to the text. The deep reading that used to come naturally has become a struggle.

   I think I know what's going on. For more than a decade now, I've been spending a lot of time online, searching and surfing and sometimes adding to the great databases of the Internet. The Web has been a godsend to me as a writer. Research that once required days in the stacks or periodical rooms of libraries can now be done in minutes. A few Google searches, some quick clicks on hyperlinks, and I've got the telltale fact or pithy quote I was after. Even when I'm not working, I'm as likely as not to be foraging in the Web's info-thickets reading and writing e-mails, scanning headlines and blog posts, watching videos and listening to podcasts, or just tripping from link to link to link. (Unlike footnotes, to which they're sometimes likened, hyperlinks don't merely point to related works; they propel you toward them.)

   For me, as for others, the Net is becoming a universal medium, the conduit for most of the information that flows through my eyes and ears and into my mind. The advantages of having immediate access to such an incredibly rich store of information are many, and they've been widely described and duly applauded. “The perfect recall of silicon memory,” *Wired's* Clive Thompson has written, “can be an enormous boon to thinking.” But that boon comes at a price. As the media theorist Marshall McLuhan pointed out in the 1960s, media are not just passive channels of information. They supply the stuff of thought, but they also shape the process of thought. And what the Net seems to be doing is chipping away my capacity for concentration and contemplation. My mind now expects to take in information the way the Net distributes it: in a swiftly moving stream of particles. Once I was a scuba diver in the sea of words. Now I zip along the surface like a guy on a Jet Ski.

   I'm not the only one. When I mention my troubles with reading to friends and acquaintances—literary types, most of them—many say they're having similar experiences. The more they use the Web, the more they have to fight to stay focused on long pieces of writing. Some of the bloggers I follow have also begun mentioning the phenomenon. Scott Karp, who writes a blog about online media, recently confessed that he has stopped reading books altogether. “I was a lit major in college, and used to be [a] voracious book reader,” he wrote. “What happened?” He speculates on the answer: “What if I do all my reading on the web not so much because the way I read has changed, i.e., I'm just seeking convenience, but because the way I THINK has changed?”

…

   Anecdotes alone don't prove much. And we still await the long-term neurological and psychological experiments that will provide a definitive picture of how Internet use affects cognition. But a recently published study of online research habits, conducted by scholars from University College London, suggests that we may well be in the midst of a sea change in the way we read and think. … They found that people using the sites exhibited “a form of skimming activity,” hopping from one source to another and rarely returning to any source they'd already visited. They typically read no more than one or two pages of an article or book before they would “bounce” out to another site. Sometimes they'd save a long article, but there's no evidence that they ever went back and actually read it. The authors of the study report:

* It is clear that users are not reading online in the traditional sense; indeed there are signs that new forms of “reading” are emerging as users “power browse” horizontally through titles, contents pages and abstracts going for quick wins. It almost seems that they go online to avoid reading in the traditional sense.

   Thanks to the ubiquity of text on the Internet, not to mention the popularity of text-messaging on cell phones, we may well be reading more today than we did in the 1970s or 1980s, when television was our medium of choice. But it's a different kind of reading, and behind it lies a different kind of thinking—perhaps even a new sense of the self. “We are not only what we read,” says Maryanne Wolf, a developmental psychologist at Tufts University and the author of *Proust and the Squid: The Story and Science of the Reading Brain.* “We are how we read.” Wolf worries that the style of reading promoted by the Net, a style that puts “efficiency” and “immediacy” above all else, may be weakening our capacity for the kind of deep reading that emerged when an earlier technology, the printing press, made long and complex works of prose commonplace. When we read online, she says, we tend to become “mere decoders of information.” Our ability to interpret text, to make the rich mental connections that form when we read deeply and without distraction, remains largely disengaged.

   Reading, explains Wolf, is not an instinctive skill for human beings. It's not etched into our genes the way speech is. We have to teach our minds how to translate the symbolic characters we see into the language we understand. And the media or other technologies we use in learning and practicing the craft of reading play an important part in shaping the neural circuits inside our brains. Experiments demonstrate that readers of ideograms, such as the Chinese, develop a mental circuitry for reading that is very different from the circuitry found in those of us whose written language employs an alphabet. The variations extend across many regions of the brain, including those that govern such essential cognitive functions as memory and the interpretation of visual and auditory stimuli. We can expect as well that the circuits woven by our use of the Net will be different from those woven by our reading of books and other printed works.

   Sometime in 1882, Friedrich Nietzsche bought a typewriter—a Malling-Hansen Writing Ball, to be precise. His vision was failing, and keeping his eyes focused on a page had become exhausting and painful, often bringing on crushing headaches. He had been forced to curtail his writing, and he feared that he would soon have to give it up. The typewriter rescued him, at least for a time. Once he had mastered touch-typing, he was able to write with his eyes closed, using only the tips of his fingers. Words could once again flow from his mind to the page.

   But the machine had a subtle effect on his work. One of Nietzsche's friends, a composer, noticed a change in the style of his writing. His already terse prose had become even tighter, more telegraphic. “Perhaps you will through this instrument even take to a new idiom,” the friend wrote in a letter, noting that, in his own work, his “‘thoughts’ in music and language often depend on the quality of pen and paper.”

   “You are right,” Nietzsche replied, “our writing equipment takes part in the forming of our thoughts.” Under the sway of the machine, writes the German media scholar Friedrich A. Kittler, Nietzsche's prose “changed from arguments to aphorisms, from thoughts to puns, from rhetoric to telegram style.”

   The human brain is almost infinitely malleable. People used to think that our mental meshwork, the dense connections formed among the 100 billion or so neurons inside our skulls, was largely fixed by the time we reached adulthood. But brain researchers have discovered that that's not the case. James Olds, a professor of neuroscience who directs the Krasnow Institute for Advanced Study at George Mason University, says that even the adult mind “is very plastic.” Nerve cells routinely break old connections and form new ones. “The brain,” according to Olds, “has the ability to reprogram itself on the fly, altering the way it functions.”

   As we use what the sociologist Daniel Bell has called our “intellectual technologies”—the tools that extend our mental rather than our physical capacities— we inevitably begin to take on the qualities of those technologies. The mechanical clock, which came into common use in the 14th century, provides a compelling example. In Technics and Civilization, the historian and cultural critic Lewis Mumford described how the clock “disassociated time from human events and helped create the belief in an independent world of mathematically measurable sequences.” The “abstract framework of divided time” became “the point of reference for both action and thought.”

   The clock's methodical ticking helped bring into being the scientific mind and the scientific man. But it also took something away. As the late MIT computer scientist Joseph Weizenbaum observed in his 1976 book, *Computer Power and Human Reason: From Judgment to Calculation,* the conception of the world that emerged from the widespread use of timekeeping instruments “remains an impoverished version of the older one, for it rests on a rejection of those direct experiences that formed the basis for, and indeed constituted, the old reality.” In deciding when to eat, to work, to sleep, to rise, we stopped listening to our senses and started obeying the clock.

   The process of adapting to new intellectual technologies is reflected in the changing metaphors we use to explain ourselves to ourselves. When the mechanical clock arrived, people began thinking of their brains as operating “like clockwork.” Today, in the age of software, we have come to think of them as operating “like computers.” But the changes, neuroscience tells us, go much deeper than metaphor. Thanks to our brain's plasticity, the adaptation occurs also at a biological level.

   The Internet promises to have particularly far-reaching effects on cognition. In a paper published in 1936, the British mathematician Alan Turing proved that a digital computer, which at the time existed only as a theoretical machine, could be programmed to perform the function of any other information-processing device. And that's what we're seeing today. The Internet, an immeasurably powerful computing system, is subsuming most of our other intellectual technologies. It's becoming our map and our clock, our printing press and our typewriter, our calculator and our telephone, and our radio and TV.

   When the Net absorbs a medium, that medium is re-created in the Net's image. It injects the medium's content with hyperlinks, blinking ads, and other digital gewgaws, and it surrounds the content with the content of all the other media it has absorbed. A new e-mail message, for instance, may announce its arrival as we're glancing over the latest headlines at a newspaper's site. The result is to scatter our attention and diffuse our concentration.

   The Net's influence doesn't end at the edges of a computer screen.… As people's minds become attuned to the crazy quilt of Internet media, traditional media have to adapt to the audience's expectations. Television programs add text crawls and pop-up ads, and magazines and newspapers shorten their articles, introduce capsule summaries, and crowd their pages with easy-to-browse info-snippets. When, in March of this year, *The New York Times* decided to devote the second and third pages of every edition to article abstracts, its design director, Tom Bodkin, explained that the “shortcuts” would give harried readers a quick “taste” of the day's news, sparing them the “less efficient” method of actually turning the pages and reading the articles. Old media have little choice but to play by the new-media rules.

   Never has a communications system played so many roles in our lives—or exerted such broad influence over our thoughts—as the Internet does today. Yet, for all that's been written about the Net, there's been little consideration of how, exactly, it's reprogramming us. The Net's intellectual ethic remains obscure.

   About the same time that Nietzsche started using his typewriter, an earnest young man named Frederick Winslow Taylor carried a stopwatch into the Midvale Steel plant in Philadelphia and began a historic series of experiments aimed at improving the efficiency of the plant's machinists.

…

   Once his system was applied to all acts of manual labor, Taylor assured his followers, it would bring about a restructuring not only of industry but of society, creating a Utopia of perfect efficiency. “In the past the man has been first,” he declared; “in the future the system must be first.”

   Taylor's system is still very much with us; it remains the ethic of industrial manufacturing. And now, thanks to the growing power that computer engineers and software coders wield over our intellectual lives, Taylor's ethic is beginning to govern the realm of the mind as well. The Internet is a machine designed for the efficient and automated collection, transmission, and manipulation of information, and its legions of programmers are intent on finding the “one best method”—the perfect algorithm—to carry out every mental movement of what we've come to describe as “knowledge work.”

…

   Google has declared that its mission is “to organize the world's information and make it universally accessible and useful.” It seeks to develop “the perfect search engine,” which it defines as something that “understands exactly what you mean and gives you back exactly what you want.” In Google's view, information is a kind of commodity, a utilitarian resource that can be mined and processed with industrial efficiency. The more pieces of information we can “access” and the faster we can extract their gist, the more productive we become as thinkers.

   Where does it end? Sergey Brin and Larry Page, the gifted young men who founded Google while pursuing doctoral degrees in computer science at Stanford, speak frequently of their desire to turn their search engine into an artificial intelligence, a HAL-like machine that might be connected directly to our brains. “The ultimate search engine is something as smart as people—or smarter,” Page said in a speech a few years back. “For us, working on search is a way to work on artificial intelligence.” In a 2004 interview with *Newsweek,* Brin said, “Certainly if you had all the world's information directly attached to your brain, or an artificial brain that was smarter than your brain, you'd be better off.” Last year, Page told a convention of scientists that Google is “really trying to build artificial intelligence and to do it on a large scale.”

   Such an ambition is a natural one, even an admirable one, for a pair of math whizzes with vast quantities of cash at their disposal and a small army of computer scientists in their employ. A fundamentally scientific enterprise, Google is motivated by a desire to use technology, in Eric Schmidt's words, “to solve problems that have never been solved before,” and artificial intelligence is the hardest problem out there. Why wouldn't Brin and Page want to be the ones to crack it?

   Still, their easy assumption that we'd all “be better off” if our brains were supplemented, or even replaced, by an artificial intelligence is unsettling. It suggests a belief that intelligence is the output of a mechanical process, a series of discrete steps that can be isolated, measured, and optimized. In Google's world, the world we enter when we go online, there's little place for the fuzziness of contemplation. Ambiguity is not an opening for insight but a bug to be fixed. The human brain is just an outdated computer that needs a faster processor and a bigger hard drive.

   The idea that our minds should operate as high-speed data-processing machines is not only built into the workings of the Internet, it is the network's reigning business model as well. The faster we surf across the Web—the more links we click and pages we view—the more opportunities Google and other companies gain to collect information about us and to feed us advertisements. Most of the proprietors of the commercial Internet have a financial stake in collecting the crumbs of data we leave behind as we flit from link to link—the more crumbs, the better. The last thing these companies want is to encourage leisurely reading or slow, concentrated thought. It's in their economic interest to drive us to distraction.

   Maybe I'm just a worrywart. Just as there's a tendency to glorify technological progress, there's a countertendency to expect the worst of every new tool or machine. In Plato's *Phaedrus,* Socrates bemoaned the development of writing. He feared that, as people came to rely on the written word as a substitute for the knowledge they used to carry inside their heads, they would, in the words of one of the dialogue's characters, “cease to exercise their memory and become forgetful.” And because they would be able to “receive a quantity of information without proper instruction,” they would “be thought very knowledgeable when they are for the most part quite ignorant.” They would be “filled with the conceit of wisdom instead of real wisdom.” Socrates wasn't wrong—the new technology did often have the effects he feared—but he was shortsighted. He couldn't foresee the many ways that writing and reading would serve to spread information, spur fresh ideas, and expand human knowledge (if not wisdom).

   The arrival of Gutenberg's printing press, in the 15th century, set off another round of teeth gnashing. The Italian humanist Hieronimo Squarciafico worried that the easy availability of books would lead to intellectual laziness, making men “less studious” and weakening their minds. Others argued that cheaply printed books and broadsheets would undermine religious authority, demean the work of scholars and scribes, and spread sedition and debauchery. As New York University professor Clay Shirky notes, “Most of the arguments made against the printing press were correct, even prescient.” But, again, the doomsayers were unable to imagine the myriad blessings that the printed word would deliver.

   So, yes, you should be skeptical of my skepticism. Perhaps those who dismiss critics of the Internet as Luddites or nostalgists will be proved correct, and from our hyperactive, data-stoked minds will spring a golden age of intellectual discovery and universal wisdom. Then again, the Net isn't the alphabet, and although it may replace the printing press, it produces something altogether different. The kind of deep reading that a sequence of printed pages promotes is valuable not just for the knowledge we acquire from the author's words but for the intellectual vibrations those words set off within our own minds. In the quiet spaces opened up by the sustained, undistracted reading of a book, or by any other act of contemplation, for that matter, we make our own associations, draw our own inferences and analogies, foster our own ideas. Deep reading, as Maryanne Wolf argues, is indistinguishable from deep thinking.

   If we Lose those quiet spaces, or fill them up with “content,” we will sacrifice something important not only in our selves but in our culture. In a recent essay, the playwright Richard Foreman eloquently described what's at stake:

* I come from a tradition of Western culture, in which the ideal (my ideal) was the complex, dense, and “cathedral-like” structure of the highly educated and articulate personality— a man or woman who carried inside themselves a personally constructed and unique version of the entire heritage of the West. [But now] I see within us all (myself included) the replacement of complex inner density with a new kind of self—evolving under the pressure of information overload and the technology of the “instantly available.”

   As we are drained of our “inner repertory of dense cultural inheritance,” Foreman concluded, we risk turning into “‘pancake people’—spread wide and thin as we connect with that vast network of information accessed by the mere touch of a button.”

   I'm haunted by that scene in *2001.* What makes it so poignant, and so weird, is the computer's emotional response to the disassembly of its mind: its despair as one circuit after another goes dark, its childlike pleading with the astronaut—“I can feel it. I can feel it. I'm afraid”—and its final reversion to what can only be called a state of innocence. HAL's outpouring of feeling contrasts with the emotionlessness that characterizes the human figures in the film, who go about their business with an almost robotic efficiency. Their thoughts and actions feel scripted, as if they're following the steps of an algorithm. In the world of *2001,* people have become so machinelike that the most human character turns out to be a machine. That's the essence of Kubrick's dark prophecy: as we come to rely on computers to mediate our understanding of the world, it is our own intelligence that flattens into artificial intelligence.

*Source:* “Is Google Making Us Stupid?” by Nicholas Carr, *The Atlantic,* July/August 2008. Reprinted by permission of the author.

**QUESTIONS FOR ANALYSIS**

* 1. Have you noticed in your own life that it's easier for you to move quickly around the Web than to spend concentrated time reading a book or lengthy article? Writing an extended essay or letter? Concentrating on an issue or problem for an extended period of time? Describe your experiences with both surfing the Web and reading books and lengthy articles in this regard.
* 2. The author notes that “The Web has been a godsend to me as a writer. Research that once required days in the stacks or periodical rooms of libraries can now be done in minutes.” Do the powerful advantages of using the Internet necessarily mean that we have to sacrifice our ability to read deeply and think reflectively?
* 3. The author acknowledges that “the Net is becoming a universal medium, the conduit for most of the information that flows through my eyes and ears and into my mind” and that this puts him at risk for being a “mere decoder of information” rather than a deep thinker *about* information. Would you say that this is true for you as well? Why or why not?
* 4. Imagine that you are the president of your college and that you want students to use the full power of the Internet in their education but you also wish them to develop their abilities to think deeply, concentrate, and contemplate. Using the problem-solving method in this chapter, analyze this problem and develop some practical solutions for dealing with this challenge.

**CHAPTER 3 Reviewing and Viewing**

**Summary**

We can become more effective *problem solvers* by approaching complex problems in an organized way:

* • Have I accepted the problem and committed myself to solving it?
* • Step 1: What is the problem?
* • Step 2: What are the alternatives?
* • Step 3: What are the advantages and/or disadvantages of each alternative?
* • Step 4: What is the solution?
* • Step 5: How well is the solution working?

This approach to solving problems is effective not only for problems that we experience personally but also for problems that we face as citizens of a community, a society, and the world.

**Assessing Your Strategies and Creating New Goals**

**How Expert a Problem Solver Am I?**

Described below are key personal attributes that are correlated with being an expert problem solver. Evaluate your position regarding each of these attributes, and use this self-evaluation to guide your choices as you shape the type of problem solver that you want to become.

**Accept the Problem**

|  |  |
| --- | --- |
| I willingly acknowledge my problems and commit myself to solving them. | I often evade my problems and fail to follow through in solving them. |
| 5    4    3    2    1 |

”Accepting” a problem means saying honestly, and without excuse, *“Yes, I have a problem, and I am committed to do what it takes to solve it.”* It's amazing how resistant people are to making this simple, courageous statement.

***Strategy:*** *Using the list of problems that you developed in the first question, create a timetable for solving each one. If you find that you are having particular difficulty in acknowledging or committing yourself to one or another problem, review the strategies for Accepting the Problem described on pages 112–113 to ignite your determination.*

**Define the Problem Clearly**

|  |  |
| --- | --- |
| I get to the “heart” of problems and define them clearly. | I often get confused trying to identify the “real” problem. |
| 5    4    3    2    1 |

Many people end up going round and round on problems because they are unable to penetrate beneath the surface to the “real” problems. They skate on the surface, mistaking the *symptoms* for the problem itself. As a critical thinker, you should distrust the simplest explanation of a problem, always asking yourself *“What are some underlying causes of the problem?” “What are some issues that I might be overlooking?” “Are there ways of looking at this that I haven't considered?”*

***Strategy:*** *By developing your abilities as a critical thinker, you will naturally learn to look beyond the superficial explanations to a more sophisticated understanding. You can also use the strategies described in Step 1: What Is the Problem? on pages 113–116, including specifying the results, identifying component problems, and viewing the problem from multiple perspectives.*

**Generate Many Alternatives**

|  |  |
| --- | --- |
| I usually come up with many diverse alternatives for solving a problem. | I generally focus on just two or three alternatives in solving a problem. |
| 5    4    3    2    1 |

Expert problem solvers have lively, fertile minds that identify many different options for solving a problem. Rather than stopping at the obvious alternatives they push themselves to think of many additional possibilities, using their creative talents to generate inventive and unique options. They also view other people as resources for helping them think of alternatives they might not have come up with on their own.

***Strategy:*** *When analyzing a problem, set a goal of generating ten, fifteen, 01 twenty alternatives, forcing yourself to break out of fixed mental ruts and go beyond the obvious to identify unusual possibilities. The section on Becoming More Creative in*[***Chapter 1***](https://jigsaw.vitalsource.com/books/9781305461864/content/id/ch1)*, pages 27–32, will help you unleash your creative potential in every area of life.*

**Evaluate the Alternatives Thoughtfully**

|  |  |
| --- | --- |
| I evaluate alternatives in an organized way. | I use my intuition to pick the best alternative. |
| 5    4    3    2    1 |

While *creative thinking* plays the main role in generating many diverse alternatives, your *critical thinking* abilities come into play in evaluating the viability of these alternatives: advantages, disadvantages, further information needed. If you start evaluating too early, when you are still generating possibilities, you run the risk of shutting off the creative flow. However, having generated the potential alternatives, if you *fail* to evaluate them in a rigorous and organized way, then you have no basis on which to reach an informed solution. Intuitions are only reliable when they are based on a great deal of thoughtful reflection and analysis.

***Strategy:*** *It is essential to evaluate these alternatives in a disciplined and organized way in order to reach an intelligent conclusion. This rigorous analysis is the mark of an expert problem solver as much as the ability to create inventive possibilities.*

**Reach Intelligent Solutions**

|  |  |
| --- | --- |
| I am skilled at finding solutions for my problems. | I consistently have difficulty in reaching solutions. |
| 5    4    3    2    1 |

While many people are perfectly willing to perform a thoughtful analysis of their problems, they often seem paralyzed when it comes time to synthesize their ideas and commit themselves to a course of action. Why? Perhaps they lack confidence in their own thinking abilities or are reluctant to take the risks that come with taking action. Whatever the reason, a chronic inability to forge a solution and commit yourself to a plan of action is a serious disability, virtually guaranteeing a life of frustration, regret, and unfulfilled dreams.

***Strategy:*** *If you have difficulty in reaching solutions and taking action to implement your plan, treat this chronic inability as a problem and use the problem-solving method to analyze it: What is the problem? Is it lack of confidence, lack of clarity, or lack of will? What are your alternatives? And so on.*

**Make Necessary Adjustments**

|  |  |
| --- | --- |
| I take a flexible approach to making adjustments and trying new alternatives. | I tend to stick with my original plans, even when they run into difficulties. |
| 5    4    3    2    1 |

As important as it is to commit yourself to a solution with determination, it is equally important to keep an open and critical mind as you implement your ideas. In most cases your solution will need adjustments, which you should willingly make.

***Strategy:*** *Commit yourself to your solutions wholeheartedly, but begin monitoring the results of your plan immediately. Make the necessary adjustments to adapt to unforeseen circumstances. If it becomes clear that your solution is not working, move quickly and decisively to implement a new solution, informed by what you have learned. Solving problems is a process, and the important thing is to keep moving forward in a positive direction, not stubbornly reenacting the Charge of the Light Brigade.*

**Suggested Films**

**Gandhi (1982)**

In the face of unjust laws, how can one effectively protest? Is it possible to achieve justice without the use of force? This film portrays the life of Mahatma Gandhi, who successfully addressed the problem of gaining human rights without violence when he used peaceful means to free India from British colonial rule in the first half of the twentieth century.

**Hotel Rwanda (2004)**

What happens when a government fails to protect its people? What responsibility do individuals have to involve themselves in issues of social justice, and what is the appropriate way to do so? In this historical film, a single man uses his social position, charisma, and intelligence to save thousands of people from the Rwandan genocide. He displays the far-reaching effects an individual can have when thinking critically to solve complex social problems.

**Lord of the Flies (1963 and 1990)**

Are humans fundamentally predisposed to selfishness, destruction, and a kind of crude “state of nature”? Based on the allegorical novel by William Golding, these two film versions chronicle the events that occur when a group of military students are stranded on an island after a plane crash.

**Slumdog Millionaire (2008)**

Is it possible to obtain freedom in spite of economic, social, and physical constraints? Jamal Malik, a teenager growing up in the slums of Mumbai, is one question away from winning India's equivalent of *“Who Wants to Be a Millionaire?”* when he is accused of cheating. Jamal recounts his life story to his interrogators in an attempt to prove that he has, in fact, acquired the knowledge necessary to be successful in spite of a challenging background, limited education, and limited resources. The story Jamal tells is one of tremendous hardship in which his ability to innovatively problem solve enables him to not only survive but, ultimately, triumph.

**Welcome to Sarajevo (1997)**

Does a country ever have an ethical right and/or responsibility to intercede in the affairs of another country? A British journalist travels to Sarajevo at the beginning of the Bosnian War, where he encounters firsthand the suffering of the people there. He also discovers an orphanage near the front line and attempts to rescue one of the children by taking her back to England with him.