2

Creative Problem Solving

A Framework for Creative Leadership

"Some look at things that are, and ask why. I dream of things that never were and ask why not?"

—George Bernard Shaw

CHAPTER AT A GLANCE

Many leadership experts have argued that one of the skills that distinguishes effective from ineffective leadership in the new millennium is the ability to successfully resolve complex challenges—the kind of problems, brought on by our rapidly changing work environments, that do not have easy answers. This chapter focuses on how the CPS process can be used by leaders to deliberately apply their imaginations to successfully address complex issues. The chapter begins by examining the kinds of problems that require creative thinking. We then compare the differences among management, creative management, and creative leadership, with a focus on how some of these leadership behaviors benefit from deliberately adopting creative thinking. The chapter closes by introducing you to the CPS process, its history and purpose, and its structure. The main function of this chapter is to help leaders recognize that they need to be creative problem solvers and that this is a process that can be deliberately learned and systematically applied.

APPLYING IMAGINATION TO SOLVE COMPLEX PROBLEMS: THAT'S WHAT LEADERS DO

A 1921 Ford auto company calendar included the following quote attributed to Mark Twain, the great American satirist, "A great, great deal has been said about the weather, but very little has ever been done." Although there is some debate as to whether Mark Twain ever uttered or penned these words, the quote can easily be applied to modern-day life and conversation regarding the pace of change—while a great, great deal has been said about the pace of change, very little has been done. Unfortunately, leaders do not have the luxury of sitting idle and watching change occur around them. Just like those individuals who take a chance when they go outside without first listening to the weather reports and forecasts, leaders who do not pay attention to change are likely to suffer from a range of unpleasant consequences, from incremental change that may cause some mild discomfort to more radical change that threatens the survival of a cause, a team, or an organization. Take Sbarro, a privately owned New York-style pizza chain that barely survived 2009. This once highly successful pizza chain pinned its growth to establishing stores in malls and airports. When the great recession of the 2000s hit, pizza consumption declined, as did foot traffic in malls. Sbarro's competitors responded by adding other food items to their menus, such as breakfast and late-night snacks. Sbarro could not, as malls have limited hours of operation. They did not have the range of responses available to them as did Domino's and Pizza Hut—change happened, and Sbarro could not respond.

Change not only brings challenges but also provides opportunities. Knowing the weather forecast, especially the long-term forecast, provides us with opportunities to create new plans. Consider those surfers who travel on a moment's notice when they learn of especially good surf conditions—surfing enthusiasts can even pay to join websites that use computer models to predict swells. Blockbuster, the movie rental chain, provides a good example of an organization that was unable to leverage opportunities in a changing marketplace. For years, this company, with its 60,000 employees, dominated the movie rental business. However, they did not foresee changes in the industry brought on by the Internet age. Now, they are trying to catch up with the cable television companies and other movie rental providers, such as Netflix and Redbox, who make renting movies extremely convenient for their customers. Blockbuster is now trying to justify their fees through all sorts of programs, such as eliminating late fees, but it may be too little too late as Blockbuster filed for bankruptcy in September 2010.

To be successful, leaders must be able to use their imaginations to react to change as well as to proactively seize opportunities inherent in change. As the authors of a recent research review concluded, "It is important for leaders to actively seek out information regarding significant events in the environment, as well as emergent technologies that can be exploited" (Byrne, Mumford, Barrett, & Vessey, 2009, p. 260).

More evidence of how leaders employ their imaginations to embrace and drive change can be found in the *Harvard Business Review* study of innovative entrepreneurs (Dyer, Gregersen, & Christensen, 2009). The innovative leaders in this study included Michael Dell of Dell Computer, Herb Kelleher of Southwest Airlines, Jeff Bezos of Amazon.com, Mike Lazaridis of Research In Motion, Pierre Omidyar of eBay, and other highly successful entrepreneurs. With respect to how these leaders view change, Dyer and his colleagues drew two conclusions, "(1) They actively desire to change the status quo, and (2) they regularly take risks to make that change happen" (p. 66). Moreover, by studying these innovative entrepreneurs, Dyer et al. identified five discovery skills that leaders can learn and practice to promote their ability to generate and embrace new ways of thinking. These skills are presented in Table 2.1. We offer two observations about the five skills found in this table. First, the skills described here, with the exception of networking, have long been associated with creative thinking and, thus, reinforce the contention of this book—in today's ever-changing environment, creativity skills are crucial to successful leadership. Second, although these skills are presented as if they were discrete, there is much overlap, as one skill may serve to reinforce another. For example, the more an individual engages in networking activities, the more likely he or she will be to make associations across unrelated fields.

KNOWING WHEN TO APPLY CREATIVE THINKING

The previous section pointed to the fact that leaders must employ their imaginations in the face of change. In this section, we more closely examine the kinds of problems that require creative thinking. It would be impractical to suggest that leaders must employ creative thinking for all problems and that individuals need to be creative leaders at all times. With this in mind, the purpose of this section is to help leaders determine when it is, and is not, necessary to bring their imaginations to bear on a problem. As we noted in Chapter 1, not all change is creative, and not all change requires you to respond with creative ideas.

Table 2.1 Learnable Leadership Discovery Skills

Discovery Skill 1: Associating

Description: Ability to draw from different fields to connect seemingly unrelated questions, problems, or ideas.

Example: Pierre Omidyar was inspired to form eBay from three unrelated experiences: (1) fascination in creating more efficient markets, (2) his fiancée's passion for collectible Pez dispensers, and (3) the limited usefulness of local classified ads in locating rare Pez dispensers.

Discovery Skill 2: Questioning

Description: Ability to ask questions that challenge prevailing thought and wisdom. Innovative entrepreneurs ask "why?," "why not?," and "what if?"

Example: Michael Dell asked why computers sold for five times the amount of the sum of their parts; the answer led to the creation of Dell Computer.

Discovery Skill 3: Observing

Description: Ability to act like anthropologists and social scientists, closely examining behaviors in others that then serve as a catalyst to breakthrough ideas.

Example: Ratan Tata, founder of Tata Motors in India, which produces a small family car that sells for roughly $2,500, got his inspiration from watching a family of four squeezed onto a motorized scooter.

Discovery Skill 4: Experimenting

Description: Willingness to actively test new ideas.

Example: Jeff Bezos's experiment with an online bookstore blossomed into the online retail giant called Amazon. Now, Amazon is experimenting with the Kindle, an electronic reader that may transform Amazon into an electronics manufacturer.

Discovery Skill 5: Networking

Description: Interacting with others from a diverse array of fields and with individuals who possess different perspectives and ideas.

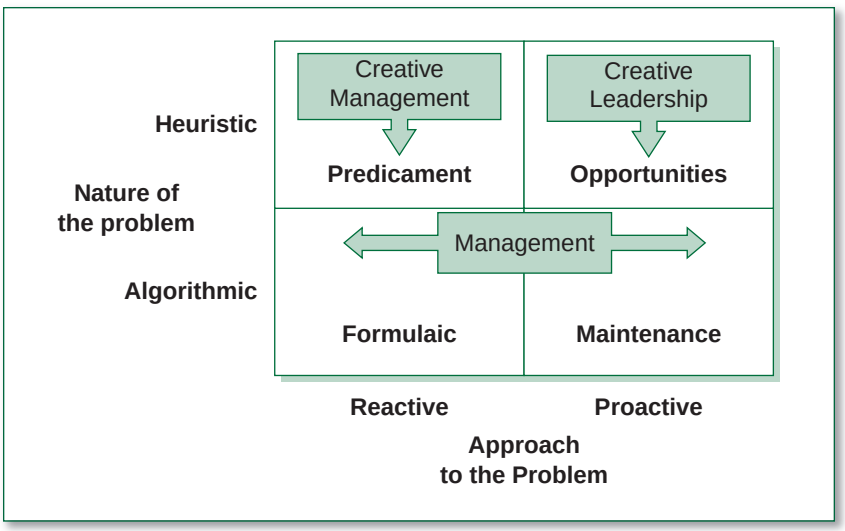
Example: Michael Lazaridis was inspired to develop the BlackBerry while attending a conference and listening to a speech on the wireless data systems used in vending machines.

Source: Dyer, Gregersen & Christensen (2009).

Figure 2.1 illustrates the kinds of problems that necessitate creative thinking. The matrix is based on two dimensions, the nature of the problem and the approach to that problem. The horizontal axis is divided between **reactive** and **proactive** approaches to problems. A reactive approach occurs when there is a change within an existing system, situation, or process. This change results in declining performance or the potential for negative outcomes; for example, a machine goes down on the manufacturing line, a cook is missing a key ingredient for a recipe, a child's sleeping pattern changes so the old bedtime routine no longer works, crime is up, sales are down, friction in the team is causing tension, or people are no longer paying attention to an advertising campaign.

In other situations, you may decide to take a proactive approach and seek forward thinking. A proactive approach to problem solving is about seizing new opportunities or finding ways to continuously improve existing circumstances. Proactive problem solving has much more to do with the pursuit of a vision or establishing goals; for example, a business pursues a new market, an inventor creates something that makes life easier, a health care provider introduces new services to the delight of its members, or a family seeks a different kind of vacation experience. In all of these cases, creative thinking has been used as a means to support forward thinking rather than as a response to a threat.

Figure 2.1 Types of Problems



Source: ©Puccio, Mance, & Murdock (2010). Reprinted with permission.

The vertical axis of Figure 2.1 refers to the nature of the problem, which can either be closed or open-ended. In closed-ended problems, the method for resolving the situation is known, and there is usually a single correct solution or a limited range of options. These kinds of problems are **algorithmic** problems because *they always lead to a single correct answer;* therefore, creative thinking is not required. In contrast, a **heuristic** problem is open-ended. *There is no set method to follow or obvious solution available.* For these problems, creative thinking is required. Deliberate creative thinking is not required when the method and solution are known, no matter whether the problem is reactive or proactive (i.e., the bottom portion of the matrix).

When the two types of approaches to problems are crossed with the two kinds of problems, four different kinds of problem scenarios emerge. In the lower left quadrant, you have the **formulaic** scenario. *This is a situation in which something changes or breaks down, and by simply following a process or formula, the situation can be corrected.* When you anticipate a future change that will negatively impact performance and you know what needs to be done to avoid any negative consequences associated with this change, you are operating in the lower right quadrant in a **maintenance** scenario. For example, people regularly change the oil in engines because they anticipate negative consequences if they do not. You need very little creative thinking to carry out routine maintenance.

Creative thinking is required, however, when the nature of the problem is heuristic, the top portion of Figure 2.1. When something goes wrong in an existing situation and you are unsure about how to correct the problem, you need creative thinking. You also need creative thinking when you perceive an external threat that will change current levels of success, such as the entry of a new competitor to the marketplace or an anticipated change to regulatory policies. These are examples of problems that we refer to as a **predicament** (see the upper left quadrant). A predicament is *a difficult, complicated, or perplexing situation for which a new approach must be devised to return to former levels of performance*. You have a predicament when something threatens current levels of performance and you need to discover or invent the best way to respond. You might be familiar with the well-known line, "Houston, I think we have a problem." It may be more accurate to say, "Houston, I think we have a predicament."

When you find yourself in the upper right quadrant, you are presented with an **opportunity**, *a favorable juncture of circumstances.* These are situations in which you decide to actively pursue some desirable possibility; for example, you believe there are unmet consumer needs in your market, you use an accidental discovery to create a new industry,

or you believe there are new ways to structure schools. Because predicaments and opportunities are open-ended, leaders must discover or invent solutions, and this process is greatly enhanced through the deliberate application of creative thinking.

These quadrants are not isolated; situations can shift and unfold in ways that move a problem from one quadrant to another. Let's look at a real example. Can you imagine waiting in line for over an hour to buy a doughnut? Seems crazy, doesn't it; but, this is exactly what happened when Krispy Kreme Doughnuts opened a new shop. Krispy Kreme, a chain of doughnut shops, aggressively expanded its business in the 1990s. In fact, during this time, they were one of the fastest growing chains in America. This explosive growth occurred during the height of America's appetite for doughnuts. Today, for a variety of reasons, doughnut consumption is significantly down. Krispy Kreme was faced with a problem and responded by employing standard solutions, for example, cutting costs and closing underperforming stores. Given this reaction, it would seem as though Krispy Kreme viewed their problem as a formulaic scenario and, as such, responded with the standard strategies. Unfortunately, these solutions have not been highly successful, as the company has not seen many profitable quarters between 2006 and 2010. So, what was initially tackled as a formulaic problem may have shifted into a predicament—a perplexing situation that requires a creative response. It was completely reasonable to begin addressing this problem by employing the standard solutions, but as these solutions did not work, it would seem as though the time has come to try more original ideas. For instance, one of Krispy Kreme's current strategies is to establish franchises overseas where the market is not saturated by other doughnut shops. Apparently, Krispy Kreme shops in overseas locations, such as Hong Kong, Malaysia, South Korea, Turkey, and Australia, are drawing large crowds.

We referred to Krispy Kreme's current situation as a predicament and not an opportunity. Why? While the organization is applying imagination to reduce the fat content in their doughnuts and have broken out of the domestic market, these are far from being game-changing propositions. Krispy Kreme is fundamentally in the same business, and they are reacting to the same goal; whether their doughnuts are low in saturated fat or sold overseas, their core business is aimed at making a profit by selling doughnuts. We can stay with the food industry to find an example of an opportunity—the breakfast sandwich. Although for many, it would seem that the fast-food giant McDonald's has always served breakfast, this has not always been the case. Before the early 1970s, McDonald's stores served only lunches and dinners,

that is, until the Egg McMuffin came along. Herb Peterson, owner of a number of McDonald's franchises in California, is credited with the creation of the Egg McMuffin. As a fan of eggs Benedict, Peterson saw an opportunity to expand the current McDonald's business into breakfast. The first Egg McMuffin was prepared for sale at the Fairview McDonald's in Goleta, California, in 1972.

The story doesn't end there. Peterson invited Ray Kroc, founder of McDonald's, to visit his store and try the new creation. As Ray Kroc (1987) wrote in his book:

> It was a crazy idea . . . but then I tasted it, and I was sold. Wow! I wanted to put this item into all of our stores immediately. Realistically, of course that was impossible. It took us nearly three years to get the egg sandwich fully integrated into our system. (p. 174)

Kroc may not have come up with the idea for the Egg McMuffin, but he was good at spotting opportunities and an entire new line of business was founded from this one tiny sandwich. Some 30 years later, McDonald's breakfast sales exceeded $6 billion annually and accounted for roughly 25% of all U.S. sales (Garber, 2005).

MANAGEMENT, CREATIVE MANAGEMENT, AND CREATIVE LEADERSHIP: WHAT'S THE DIFFERENCE?

We present Figure 2.1 to highlight the kinds of problems that require creative thinking and those that do not. As creativity experts, we do not wish to convey a belief that all problems require a creative approach; this is simply not the case. Throughout the course of their work, leaders are faced with all four problem scenarios described in Figure 2.1; the trick for leaders is to effectively diagnose the nature of problems and then to respond accordingly. The distinctions made among these problem scenarios help to identify three types of behaviors leaders can engage in when they respond to problems, and we believe these behaviors help to clarify the difference between management and leadership.

Are the processes, the concomitant behaviors associated with management and leadership, one and the same? Are the terms management and leadership synonymous? Many agree that management and leadership imply different concepts and have written about the fundamental differences between these two constructs (e.g., Bennis & Nanus,

1985; Gardner, 1990; Kotter, 1990; Munitz, 1988; Palus & Horth, 2002; Zaleznik, 1977, 1998).

Bennis and Nanus (1985), for example, interviewed 60 successful CEOs and 30 outstanding public sector leaders and found a clear contrast between management and leadership. They reported:

> There is a profound difference between management and leadership, and both are important. "To manage" means "to bring about, to accomplish, to have charge of or responsibility to conduct." "Leading" is "influencing, guiding in direction, course, action, opinion." The distinction is crucial. Managers are people who do things right and leaders are people who do the right things. (p. 21)

Bennis and Nanus summarized their findings by saying that management is driven by efficiency, a focus on mastering routine activities, where leadership is motivated by effectiveness.

John Kotter (1990), a business professor at Harvard University, described both leadership and management as processes. Kotter maintained that leadership is a process whose function is to produce change, while management is a process focused on producing consistent outcomes. Along similar lines, Fullan (2001) contrasted leadership and management in the following way:

> I have never been fond of distinguishing between leadership and management: they overlap and you need both qualities. But here is one difference it makes sense to highlight: leadership is needed for problems that do not have easy answers. . . . For these problems there are no once-and-for-all answers. Yet we expect leaders to provide solutions. (p. 2)

As exemplified in the views above, it would seem that management is focused on maintaining the present situation, while leadership is focused on complexity and change, not just any change but creative change, that is, bringing a new idea or approach into existence. It would seem, therefore, that creative thinking is generally associated with leadership and not with management. This bias can be seen in Zaleznik's (1998) update to his classic, and oft cited, essay on the difference between managers and leaders. As Zaleznik (1998) suggested:

> It seems to me that business leaders have much more in common with artists, scientists, and other creative thinkers than they do with managers. For business schools to exploit this commonality of dispositions and interests the curriculum should worry less about the logics of strategy and imposing the constraints of computer exercises and more about

> thought experiments in the play of creativity and imagination. If they are successful, they would then do a better job of preparing exceptional men and women for positions of leadership. (p. 87)

We do not subscribe to the prevailing wisdom that seems to indicate that leadership involves creativity and management does not. Indeed, we fell into this same line of thinking in the first edition of this book. Upon reflection, we believe that this is a gross and imprecise distinction. Let us be clear; we suggest that to be successful, a leader must engage in at least three distinct and broad processes, that is, sets of behavior. **Management**, as described above, is *a process that focuses on using standard procedures to sustain the present situation.* Management, as a process, is most appropriately applied to formulaic and maintenance problems, as the goal is to respond to change, either by reacting to it or proactively anticipating it by using known procedures to maintain the status quo. Here, there is no need for creative thinking, and there are times when leaders simply need to engage in management behavior.

Sometimes, however, the situation requires a novel response in order to return to former levels of performance. Again, we refer to this situation as a predicament. There has been a change that has modified current levels of performance, and the tried-and-true ways of responding are unlikely to work, so the leader must find a new approach that will rectify the problem. We call this process **creative management**—*creative thinking is applied to develop original solutions that enable the situation to return to prior levels of performance.* For example, if Krispy Kreme is able to make a reduced-fat doughnut that is as appealing as their original doughnuts, and as a consequence, sales return to their former levels, then it could be concluded that they creatively managed their profitability problem. The intent of creative management is not to change the goal but to change the solutions or approaches used to achieve the goal.

Finally, there are times when the leader becomes aware of an opportunity, such as the Egg McMuffin example shared earlier. In such cases, the leader is engaged in the process we call creative leadership. And, as described in Chapter 1, **creative leadership** is *deliberately engaging one's imagination to define and guide a group toward a novel goal—a direction that is new for the group.* Both Peterson, the developer of the Egg McMuffin, and Kroc, the person who leveraged this new opportunity, displayed creative leadership behavior when they embarked on the pursuit of McDonald's breakfast business.

Through this discourse, we want to underscore two important points. First, both managers and leaders use creativity in their work, just in different ways. Managers use creativity to solve problems that threaten the status quo, while leaders use creativity to pursue new directions. Second, we want to make a distinction between the person and the process. When we discuss managers and leaders, we are referring to people, while the terms management, creative management, and creative leadership refer to behaviors. Whether someone is a manager or leader, to be successful over time, he or she will need to master these three sets of behavior—management, creative management, and creative leadership.

LEADERS ARE CREATIVE PROBLEM SOLVERS

The kinds of problems leaders face, predicaments and opportunities, necessitate creative problem solving. As Byrne et al. (2009) offered at the conclusion of their published study of what leaders do and think to promote creative efforts:

> Due to the complex nature of the behaviors and considerations required, developing the skills needed to lead innovation will take a substantial amount of time, and this development should occur in a systematic way. Leader training should involve the enhancement of creative problem-solving skills and reshaping the common assumptions often held about creative work. (p. 265)

This quote summarizes a major focus of this book, the systematic development of leaders' creative problem-solving skills.

Building directly from the recommendation provided by Byrne et al., we now turn to a process model designed to promote creative problem-solving skills. Suppose you had a treasure map that would lead you to gold no matter where or when you used it—all you had to do was set a few goals, figure out the general direction, and know how to effectively use the map under a variety of conditions. The CPS process is a thinking and doing map that will get you the gold—the nuggets of ideas and the glimmer and shine of implementation. Many people have used the CPS map over the years. It has a rich history, and variations of its conceptual model have been widely adopted to deliberately foster creative thought. We suggest that leaders can learn to use this map to more skillfully respond to problems that require creative change. Box 2.1 gives a brief overview of CPS history.

BOX 2.1 HISTORICAL NOTE

Creative Problem Solving: A Brief History

Our center—the International Center for Studies in Creativity—was founded on the pioneering work of three individuals. Alex Osborn, an advertising executive who developed the creative thinking tool brainstorming, was the originator of the CPS process and model. Osborn began his work on deliberate creativity in the 1940s. In the 1950s, he teamed with a college professor, Sidney Parnes, to further develop and research CPS. The early studies carried out by Parnes demonstrated that training in the CPS process enhanced individuals' creative thinking skills (Meadow & Parnes, 1959; Meadow, Parnes & Reese, 1959; Parnes & Meadow, 1959, 1960). Parnes in turn teamed with Ruth Noller, originally a professor of mathematics, to design, deliver, and test the groundbreaking college curriculum in creativity at Buffalo State College (Noller & Parnes, 1972; Parnes & Noller, 1972a, 1972b, 1973; Reese, Parnes, Treffinger, & Kaltsounis, 1976). At the same time that research into the impact of CPS training was occurring, the model itself was being modified. Lessons learned through research and application guided the evolution of the CPS model. Although the original seven-step model introduced by Osborn in 1953 (i.e., Orientation, Preparation, Analysis, Hypothesis, Incubation, Synthesis, and Verification) has changed through the years, current versions of the process still retain many of the hallmark features found in the early work. For a review of the evolution of CPS, see Puccio, Murdock, and Mance (2005) and Isaksen and Treffinger (2004).

Since Osborn first introduced CPS in the 1950s, the process has undergone continuous development and research, keeping it dynamic and fresh. The basic reason why the CPS process has stood the test of time is that it works! What makes the CPS process work so well? Here are four basic reasons:

1. The CPS process parallels people's natural creative thinking processes by efficiently organizing what happens when they work with problems. This means that CPS has an intuitive base that is easy to tap into in more explicit ways.
2. Through the alternating phases of divergent (generating options) and convergent (evaluating options) thinking, and the use of tools that support them, CPS provides a way to manage that most ferocious opponent of creative thinking—premature or inappropriate judgment.

3. CPS combines thinking with doing, which helps people accomplish concrete actions and get results from their initial ideas.
4. Finally, CPS provides a flexible format that is capable of taking in many creativity tools and approaches.

Creative Problem Solving: Some Basic Terms

What do we mean when we talk about CPS? **CPS** is *a comprehensive cognitive and affective system built on our natural creative processes that deliberately ignites creative thinking and, as a result, generates creative solutions and change.* The CPS process has a dual function: thinking and doing. As human beings, we are not strangers to thinking and doing, or we would not have survived and thrived this long. But, we are less familiar, and often less comfortable, with being deliberate about the processes we use. To be clear, a **process** is defined as *a particular method of doing something, generally involving a number of steps or operations.* CPS as a deliberate creative process takes intuitive responses to open-ended problems and moves them from trial and error to targeted strategies. In accomplishing this, CPS (1) influences how people think about themselves and the world around them in relation to change; and (2) improves individual and team performance for problems that appear to have no immediate solution.

Does this sound like a natural partner for leadership? We think so—especially since leaders have to think differently. Because novelty is inherent in creative change, leaders often confront novel situations that have no set procedure or single right pathway forward. Under such conditions, leaders have to help their intuition along a bit—there is a need for deliberate creative thinking, and this is the job of CPS. It's the map that can lead you to the gold. Again, when we say **creative** we mean *the production of ideas or options that are both new and useful,* and this is the outcome leaders are searching for when they are challenged by novel situations. Discovering new ways to improve customer service, finding the next product idea to stay ahead of the competition, identifying energizing ways to engage learners or revitalizing a city are examples of the kinds of novel and complex situations that require leaders to search for creative solutions.

We will now turn to the second word in the CPS acronym, problem. We look at **problem** in its broadest sense to describe *what exists when there is a gap between what you have and what you want.* This gap creates dissatisfaction, and dissatisfaction, in turn, creates interest in finding some means for closing the gap. Mumford et al. (2000) indicated

that leadership problems are quite different in their nature from managerial problems. They defined the types of problems leaders face as being **ill-defined** (i.e., *no single solution path*), **novel** (i.e., *the situation is either changing or new*), and **complex** (i.e., *information is missing or it is difficult to determine what is relevant*). Their definition captures the kinds of problems CPS is designed to address.

Finally, by **solving** we mean *taking action in some way*—it's the implementation part of the CPS process. Here, solving implies finding answers or resolutions to situations, but it also encompasses everything involved in looking for or refining those answers. Creativity isn't complete by just thinking about something new or useful—it is the direct result of someone taking action and bringing a new idea to fruition. CPS as a process is about transforming creative ideas into creative solutions for complex problems, thereby leading to productive change.

Since its introduction more than 50 years ago, CPS is one of the most widely used creative process models in both education and industry. Given its popularity, CPS has been the subject of many research studies. These studies have empirically evaluated the effectiveness of CPS training. If you are interested in the research that supports the impact of CPS, see Box 2.2.

BOX 2.2 RESEARCH NOTE

Does Creative Problem Solving Work?

In the late 1960s and early 1970s, Parnes and Noller carried out a comprehensive examination of the impact of CPS training. The Creative Studies Project is reported in a number of literature sources (see Parnes, 1987; Parnes & Noller, 1972a, 1972b, 1973; Reese et al. 1976). Parnes and Noller studied the effects of four semester-long creativity courses on undergraduate students. The main creativity model featured in this educational program was CPS. Students entering the freshman class at Buffalo State College were invited to participate in the research study. Volunteers were randomly assigned to either an experimental group, who were enrolled in the four creativity courses taught over a two-year period, or to a control group, who were not enrolled in the creativity courses.

Pre- and posttest paper-and-pencil measures were administered to all students in the study. Many of these measures were drawn from Guilford's Structure-of-the-Intellect model (Guilford, 1977). These comparisons revealed that the experimental group had statistically significant gains after the training in comparison to the students in the control group. The students who participated in the creativity courses showed significant differences on measures of divergent production, convergent production, and cognition.

A number of other researchers have conducted studies in which various creativity programs have been compared in regard to their effectiveness (Rose & Lin, 1984; Scott, Leritz, & Mumford, 2004a, 2004b; Torrance, 1972; Torrance & Presbury, 1984). Such studies supported the positive effects of CPS training. Torrance (1972), who studied the effectiveness of nine different kinds of creativity programs, found that CPS achieved the highest percentage of success (i.e., 20 of the 22 studies yielded significant results). Rose and Lin (1984) conducted a meta-analytic evaluation of creativity programs. To provide a basis for their evaluation of different creativity programs, Rose and Lin evaluated research studies that used the Torrance Tests of Creative Thinking as a measure of the impact of training. In examining the effect training had on Torrance's measure of creative-thinking skills, these authors concluded that the substantial impact of CPS on verbal creativity provided clear evidence for its effectiveness. A more recent comparative analysis by Scott et al. (2004b) found that cognitively oriented creative process programs, such as CPS, proved to have positive effects on participants.

Many of the studies involved in these comparative reviews were carried out in educational contexts, but what about the impact of CPS training in organizational settings? A number of studies have empirically evaluated CPS training with professionals, perhaps most notably, the program of research carried out by Basadur and his colleagues. Basadur, Graen, & Green (1982) demonstrated that employees trained in CPS outperformed control and placebo groups. For example, employees trained in CPS were more fluent in generating new product ideas, produced better ideas for new products, and were more effective at problem finding. Basadur, Graen, and Scandura (1986) reported that CPS training significantly enhanced engineers' attitudes toward divergent thinking. Basadur went on to demonstrate that similar results could be achieved with managers in Japan (Basadur, Wakabayashi, & Takai, 1992) and South America (Basadur, Pringle, & Kirkland, 2002). He also reported the positive effects of CPS training on union–management negotiations. According to Basadur, Pringle, Speranzini, and Bacot (2000), CPS training improved trust between negotiating parties and resulted in new solutions. Positive results of CPS training in the workplace have been reported by Kabanoff and Bottger (1991); Fontenot (1993); Wang, Wu, and Horng (1999); Wang and Horng (2002); and Wang, Horng, Hung, and Huang (2004). See Puccio, Firestien, Coyle, and Masucci (2006), and Puccio et al. (2005) for a review of additional CPS impact studies in organizations.

As a result of a quantitative analysis of creativity programs, Scott et al. (2004a) concluded that creativity training does work. Specifically, training has been shown to significantly impact divergent thinking, problem solving, performance, attitudes, and behaviors. These authors cited CPS as one of the more successful creativity programs. This success was attributed to this program's description of "the key cognitive processes underlying creative thought" (p. 283) in combination with strategies for applying these processes.

CREATIVE PROBLEM SOLVING: INTRODUCING THE THINKING SKILLS

So what is CPS, and how does it work? In this section, we present our current view of the CPS process along with a graphic model that depicts how the process operates. As we noted earlier, the CPS process has been refined through the years, and what we present is an extension of this work. Also, it should be noted that, given the extent to which CPS has been diffused, there are alternative conceptions of this deliberate creative process in use; for example, see Basadur (1994); Isaksen, Dorval, and Treffinger (2000); Miller, Vehar, and Firestien (2001); and Parnes (2004). Figure 2.2 presents our view of CPS—an approach that we think works for developing the thinking skills related to creativity, which help leaders effectively respond to predicaments and take advantage of perceived opportunities. Since this version of CPS is the first to specifically articulate the thinking skills associated with each step of the process, we refer to it as *Creative Problem Solving: The Thinking Skills Model.* The remaining chapters in Part I of this book go more deeply into the specific thinking skills associated with the CPS model.

Model Structure

The structure of CPS, working from the outside inward, is comprised of three conceptual stages, six explicit process steps with six repetitions of divergence and convergence within each, and one executive step at the heart of the model to guide them all. The three conceptual stages—*Clarification, Transformation,* and *Implementation*—are related to your natural creative process. These are general terms that identify the beginning, middle, and end of the creative process. People implicitly move through them in a natural progression whether they are consciously aware of it or not. For instance, to get started with any process, you must understand *what needs to be resolved* **(Clarification Stage)**. Next, you need to *identify potential ideas and craft them into workable solutions* **(Transformation Stage)**. Finally, you need to *refine the solutions and put together a plan for taking effective action* **(Implementation Stage)**.

In fact, Mintzberg, Duru, and Theoret's (1976) examination of real-life problem solving yielded three major phases labeled *identification* (understanding the problem), *development* (creating potential solutions), and *selection* (deciding among the solutions). Various researchers have identified similar three-stage descriptions of problem solving (Johnson & Jennings, 1963; Simon 1965, 1977). After reviewing the problem-solving research, cognitive psychologist Geir Kaufmann (1988) concluded,

Figure 2.2 Creative Problem Solving: The Thinking Skills Model

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"There is a striking agreement in the literature describing the phases of a problem-solving event. Normally, three major phases are identified" (p. 98). We believe these three phases are reflected in CPS.

Although the basic stages of the problem solving process have been shown to be empirically distinguishable, researchers have found that people will naturally move forward, backward, and across these elements (Mintzberg et al., 1976). So, although the three stages of CPS represent the natural progression individuals go through when faced with an open-ended problem, it is not always the case that this flow will occur in a sequential manner. Sometimes, it may seem like you have skipped stages, but in reality, your mind is working so quickly that you may not be aware of your stages of thought, or the issue may be relatively simple and require less time to process.

Understanding the basic structure of CPS can help when you get lost in nonsystematic, explicit use of the creative process. For example, have you ever been in a meeting where things got so complicated that you lost track of where you or others were in the conversation? Or have you ever heard people say things like the following: "Where are we going with this?" "What are we supposed to be doing?" "It feels like we are going in circles." If you find yourself wondering, "aren't we just spinning our wheels here?," then, you probably are! Think of the CPS model as a cognitive map and the three stages as major regions within this map. When you find yourself lost while addressing a predicament or pursuing an opportunity, use the CPS cognitive map to guide yourself out of the woods. Ask questions related to the CPS framework to help locate yourself within the process. "Do I, or we, need to further clarify this situation?" "Have I, or we, explored a sufficient number of ideas to identify a potential solution to this situation?" "Am I, or are we, committed to a solution to be implemented?" Such questions can help get a derailed process back on course.

The formal application of CPS involves six explicit process steps. These six steps are designed to help enhance people's effectiveness by linking their natural processes to a systematic and explicit series of operations. The six formal steps of CPS are: *Exploring the Vision; Formulating Challenges; Exploring Ideas; Formulating Solutions; Exploring Acceptance;* and *Formulating a Plan.* In each natural process stage, there are two steps—the first explicit step begins with the word *exploring*, and the second step begins with *formulating* because the first is more general or abstract than the second. In this manner, the movement from the first step in each stage to the second should represent a transition from the exploration of broader concepts to the formalization of more concrete outcomes. Clarification begins with the broad examination of a vision (Exploring the Vision) and concludes with the identification of specific challenges that must be addressed in order to achieve the vision (Formulating Challenges). Transformation begins with the broad search for potential ideas to address the previously identified challenges (Exploring Ideas) and ends with the best ideas being developed into concrete solutions (Formulating Solutions). Finally, Implementation starts with a review of the factors that will help or hinder the successful advancement of the solution (Exploring Acceptance), which are then used to create a detailed plan of action (Formulating a Plan).

Each of the six steps is represented by a diamond-shaped figure that shows the internal phases of divergent (i.e. generating options) and convergent (i.e. selecting or evaluating options) thinking within

each step. This repeating function continuously separates and then applies the use of judgment in a balanced way, giving change and novelty a better chance at surviving the powerful censors that people often place on something new. This balance between divergent and convergent thinking has been the hallmark of the CPS process and, as such, is described in further detail in Chapter 3.

The six explicit steps have no required order for use, although they are presented here in the natural flow of the conceptual stages. You can begin with any step that you need or want to; you can go back if you realize you forgot something or just think it's a better place to be at the time. You can skip over any of them if you have what you need. Effectively using CPS is like going to the checkout line when you have finished your shopping—it's not the number of items that you have in your cart that indicates you are finished but the fact that you have all you came for, that your purpose was accomplished.

There is one more step to the CPS process, the executive step, called Assessing the Situation. We refer to Assessing the Situation as the executive step because it helps you to stand above the other steps to determine where to go in the process and how to progress through it. Assessing the Situation involves the use of metacognitive thought. Based on Flavell's (1976) work, we define **metacognition** as *an individual's ability to monitor and control his or her own cognitive processes.* Simply put, metacognition means thinking about your own thinking. When Assessing the Situation, you gather data and use this data to make decisions about how to proceed. As such, the higher-order function of this step becomes the gateway to the six explicit steps—sources of data in the form of facts, intuition, feelings, or answers to questions will enable you to determine which of the six CPS steps will be most useful in addressing a predicament or opportunity. Since there is no predetermined second step in CPS, the diagnosis of information from Assessing the Situation determines where you should go next. Use of the rest of the model is based on what the situation dictates: Do you need to explore or formulate, and if so, how—by clarifying, transforming, or implementing? CPS is a thinking person's process. You can't switch on autopilot and switch off thinking. You don't simply take every situation, no matter what its qualities, and force it through the whole model, although if you need all the steps, you can certainly use them. This flexible nature of CPS is a characteristic that has made it useful and enduring, and that flexibility makes it appropriate to lead change effectively.

We have presented many concepts in this chapter. Box 2.3 provides a summary of some of the key vocabulary referred to in this chapter.

BOX 2.3 KEY VOCABULARY

Some Key Concepts From Chapter 2 Organized by Category

Types of Problems

Formulaic: a situation in which something changes or breaks down, and by simply following a process or formula, the situation can be corrected.

Maintenance: a situation in which one anticipates a future change that will negatively impact performance, and a known procedure or solution can be used to avoid any negative consequences associated with this change.

Predicament: a difficult, complicated, or perplexing situation for which a new approach must be devised to return to former levels of performance.

Opportunity: a favorable juncture of circumstances in which you decide to actively pursue some desirable possibility.

Leader Behaviors

Management: a process that focuses on using standard procedures to sustain the present situation.

Creative Management: a process in which the leader applies creative thinking to develop original solutions that result in the situation returning to prior levels of performance.

Creative Leadership: a process in which a leader deliberately engages his or her imagination to define and guide a group toward a novel goal—a direction that is new for the group (see elaborated definition found in Chapter 1).

Creative Problem Solving Terms

Creative Problem Solving (CPS): a comprehensive cognitive and affective system built on our natural creative processes that deliberately ignites creative thinking and, as a result, generates creative solutions and change.

Process: a particular method of doing something, generally involving a number of steps or operations.

Metacognition: an individual's ability to monitor and control his or her own cognitive processes.

APPLYING WHAT YOU'VE LEARNED

In this chapter, we explored the types of problems that require creative thinking and those that do not. We described how leaders, to be effective, must employ their imaginations to resolve complex problems. To that end, we introduced CPS, a creative process with a long-standing history that can be learned and practiced by leaders to address predicaments and pursue opportunities. Leadership is more about what you do than who you are, and therefore, because leaders are required to respond imaginatively to change, CPS can be used as a tool by leaders to make themselves more effective.

1. Identify a problem you successfully solved. Think back to the process steps you went through in solving this problem. Record these steps and then compare them to the CPS process described in this chapter. How is what you did similar to CPS? How is it different? In what ways might an explicit creative process, such as CPS, help to improve your effectiveness? What aspects of CPS do you feel come most naturally to you? What aspects of CPS do you think will be most beneficial for you to learn? Why?
2. Make a list of all the personal and professional problems that currently exist in your life. Using Figure 2.1 in this chapter, diagnose the nature of each problem. Which of these problems fall into the formulaic category? Are there those that are more like maintenance issues? Which of the problems from your list require creative thinking? Do some of these predicaments, situations that you are responding to, require new thinking, while others are opportunities, new goals, or directions for you? Did any of these situations change over time? Can you find examples of a problem that might have initially fallen into a category and then, over time, migrated to a new category? Why or how did this happen?
3. Find a story or an example of a leader who demonstrates the use of management, creative management, and creative leadership processes. What did it look like when this leader was engaged in management? What behaviors did he or she exhibit when involved in creative management? What were the distinguishing features demonstrated by this leader when he or she exhibited creative leadership tendencies? With respect to creative management and creative leadership processes, what did the leader do to get his or her new way of thinking accepted by others? From this analysis, what can you learn about your own effectiveness as a leader?