Creative Problem Solving: A Deliberate Creative Process

In Part 2 we discussed the natural process of creative thinking. In this part we answer these questions: *What if I want to enhance my natural creativity? What if I want to be creative on purpose?*

Creative Problem Solving (CPS) is a comprehensive system that deliberately ignites creative thinking, resulting in the generation of creative solutions and productive change.

Because thinking, including creative thinking, is a natural process, we are already inclined to naturally engage in these skills. Using a deliberate process (such as CPS) simply means doing something on purpose, and paying attention to how you do it, so that you can do it as well as you can.

Here's an example. It is safe for us to assume that you are, right now, breathing. This is not something you have to think about. And yet there are times when you want to think about your breathing, and to do it in a deliberate fashion: when you are out for a run, or being examined by your doctor, or hiking at a high elevation, or playing a wind instrument, or meditating.

So it is with creativity. When you need to, you can apply a deliberate creative process in order to ensure that you are performing this natural life skill as well as you can for the circumstance that requires it. We solve problems all the time, and most of the time we allow our natural instincts to guide us. However, there are many circumstances that call out for a more deliberate approach, such as when working in a group, and when working with a particularly difficult or complex problem, like those open-ended predicaments or opportunities (described in Chapter 1) for which there are no set procedures to follow or no obvious solutions.

The CPS process parallels our own natural creative thinking processes and, simply put, organizes them more efficiently. It takes intuitive responses to open-ended problems and transforms them into targeted strategies.

It is important to note that CPS is a process for both thinking and *doing:* it helps people accomplish concrete actions and bring their ideas to fruition. This dual function inherent in the CPS process is conveyed by the name itself. Let's take a look at the basic terms that make up "Creative Problem Solving process."

- By "creative" we mean the production of *ideas or options that are both new and useful*. They contain elements of novelty, uniqueness, originality, and they have value, are relevant, serve a purpose.
- By "problem" we mean a situation that exists when there is *a gap between what you have and what you want*. Novel, ill-defined and complex problems are the kinds of problems that CPS is designed to address.
- By "solving" we mean *taking action in some way*. The implementation stage of the CPS process includes refining solutions and making them work in the environment and context in which they will be introduced.
- By "process" we mean a particular method of doing something, generally involving a number of steps or operations.[1]

Earlier, we discussed the separation of divergence and convergence when engaged in creative thinking. CPS, which is deliberate creative thinking, must of course employ this same separation. By doing so, CPS helps people avoid the start-and-stop thinking that limits both the productive flow of ideas and efficient decision making. Consider, as an illustration of these limits, the directionless, start-and-stop nature of so many business meetings. People engage in endless discussions, wandering from one question to another, diverging and converging at the same time…and as a result, neither exploring all their options, nor exploring them very well. The result: no decisions, poor decisions, no closure, premature closure.

In addition to the separation of divergent and convergent thinking, there is another factor. What makes CPS particularly effective—and what separates it from other so-called "creative" processes—is the use of divergence and convergence *at each step of the process*. (There are other processes that employ divergent thinking only in the idea generation step.) By extending the power of divergence and convergence to each step of the process, we maximize our creative thinking ability and our ability to produce creative outcomes.

As we noted earlier, creative thinking is a higher-order thinking skill. As such, the purpose of the CPS process is to organize and enhance that thinking skill. Although CPS is designed primarily to nurture creative thinking in problem solving, it also involves decision making, critical thinking, strategic thinking, and many other thinking skills. (The **CPS Thinking Skills Model** that we will introduce in the next section identifies specific thinking skills that people use when they engage in the CPS process.) Thus, we make the case that CPS operates *as a macro process for thinking*.[2] This has a profound implication for those who study, learn, and use CPS: it means that CPS is a conceptual framework that helps organize and improve your thinking, *for any context in which you apply your thinking*. By learning and practicing CPS, not only do you learn the steps of a problem-solving process, but you also learn *how* to think and how to sharpen your thinking abilities, even when not engaged in problem solving. Simply put: when you learn CPS, you learn to be a better thinker.

Creative Problem Solving: A Brief History[3]

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 Creative Problem Solving (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 (see: Meadow & Parnes, 1959; Meadow, Parnes, & Reese, 1959; Parnes & Meadow, 1959, 1960). Parnes, in turn, teamed up with Ruth Noller, originally a professor of mathematics, to design, deliver, and test the groundbreaking college curriculum in creativity at Buffalo State College (see: Noller & Parnes, 1972; Parnes & Noller, 1972a, 1972b, 1973; Resse, 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 et al., 2005; and Isaksen and Treffinger, 2004.)

CPS: The Thinking Skills Model

CPS has a long history (see the sidebar on page 73). As such, it is one of the most widely used and researched models of the creative process. Throughout its history CPS has been modified and refined. The version of CPS presented in this book was developed by Gerard Puccio, Marie Mance, and Mary Murdock and is formally called *CPS: the Thinking Skills Model,* as it was the first version of CPS to formally describe both the cognitive and affective skills that are used during the process.[4] This blend creates a comprehensive look at the cognitive work of problem solving, and at the nature of thinking itself. For simplicity's sake, we will use the shorter name, CPS, when referring to this model.

CPS is illustrated in Figure 8. The structure of the model, working from outside inward, comprises three conceptual stages, six explicit process steps (each with a repetition of divergence and convergence), and one executive step at the heart of the model to guide them all. (We realize this has a Tolkien-esque "one ring" feel to it, and that's not entirely unintentional.)

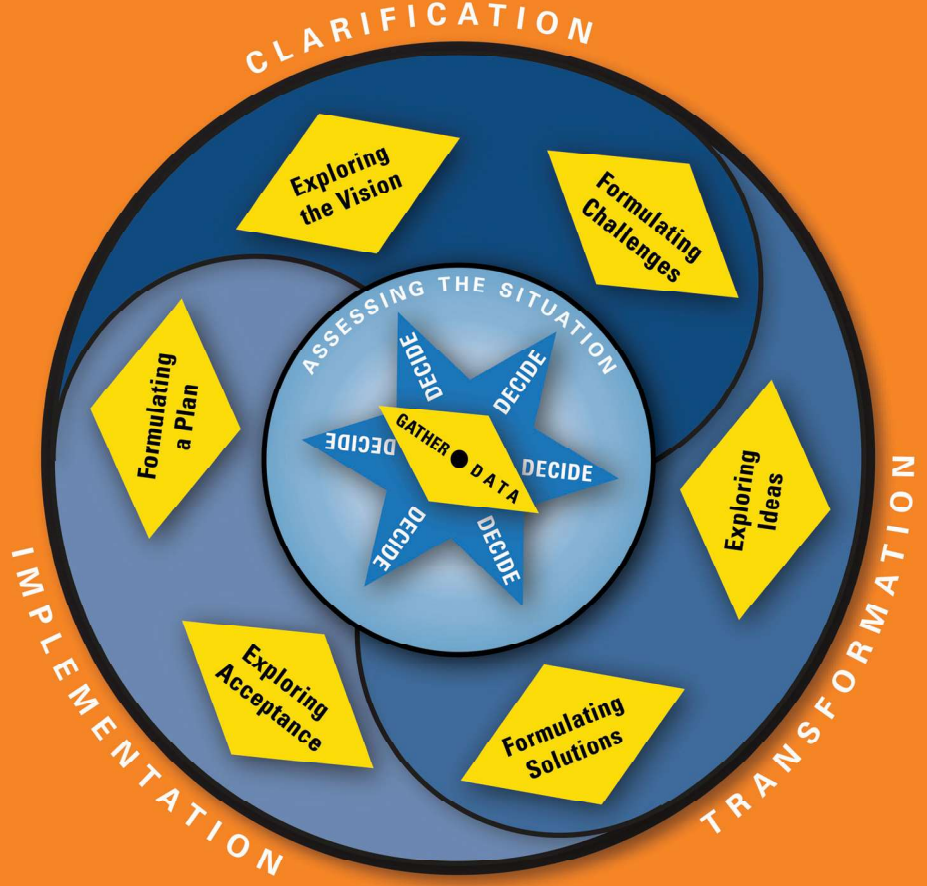
The three conceptual stages reflect the natural creative process that people apply when they face any challenge or opportunity. They first need to **clarify** the direction they want to pursue, as well as the obstacles they are facing. Next, they need to **transform** the reality they are facing, by identifying potential ideas and developing them into viable solutions. Finally, they need to **implement** the devised solutions, by constructing a plan for taking effective action. Each stage includes two formal steps:

Clarification Stage	*Transformation Stage*	*Implementation Stage*
• Exploring the Vision	• Exploring Ideas	• Exploring Acceptance
• Formulating Challenges	• Formulating Solutions	• Formulating a Plan

In each stage the first step begins with "Exploring" followed by the next step of "Formulating." The first step is more exploratory or abstract while the second is more focused and concrete. Thus, each stage is designed to move from broader concepts to concrete outcomes. The Clarification stage begins with exploring a broad vision, and ends with identifying specific challenges that must be addressed to achieve it. The Transformation stage starts with a broad search for potential ideas to respond to those challenges, and ends with the development of workable solutions. The Implementation stage begins with a broad exploration of the context that will support or hinder the implementation of those solutions, and ends with a detailed plan for action.

The alternation of Exploring and Formulating is designed to express the different nature of the thinking underlying each of the two steps (i.e., abstract vs. concrete). It is not to be confused with the balance between

Creative Problem Solving: the Thinking Skills Model



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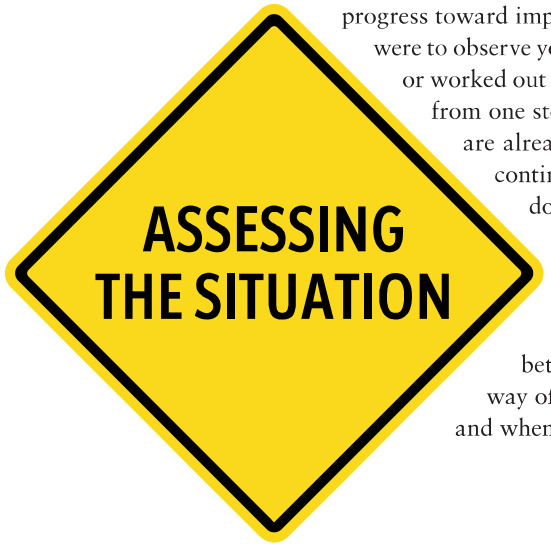
divergence and convergence, the cornerstones of creative thinking, which are used in each step of the process, both when Exploring and when Formulating. Take note of the diamond shape within each process step. Through much of CPS's history, the diamond has been used to represent the balance of divergent and convergent thinking: starting at the top of the diamond, it opens up to represent divergence, then closes to represent convergence.

At the center of the model is the meta-step, **Assessing the Situation**. This is the control function, the act of thinking about your thinking. It is "metacognitive" because it involves your ability to monitor and direct your own thinking process. Previously we used the analogy of driving a car (accelerating and braking), and we can extend it here: when Assessing the Situation, you are steering your thinking in the most appropriate direction. This is where you *begin* the CPS process, and this is how you monitor your progression *through* the process. When Assessing the Situation, you discover and identify relevant information (shown in the model as Gather Data); and you determine if the situation requires creative thinking and, if so, where to enter within the CPS process. It is therefore an executive step that is repeated throughout the process. (We were tempted to call this the "mother" step, but our mothers did not approve. And yes, we do see the irony in that.)



The circular illustration of the CPS model makes a point: problem solving follows a natural flow—forward progress toward implementation being the goal, after all—but problem solving may also ebb and flow. If you were to observe your natural creative process in action, you might feel like you skipped a step here and there, or worked out of order. That's natural: sometimes your mind moves too quickly to notice the progression from one step to the next; sometimes you need to backtrack; sometimes you skip over the parts that are already clear in your mind. Note the center of the illustration: when you problem-solve, you continually return to the center to see where you are, to make decisions, and to decide what to do next. In a natural process, you may do this without paying attention to it; in a deliberate process, you do it on purpose.

There is one more essential point to be made here: the process steps are both integrated (they can work together), and independent (they can stand alone). CPS is flexible. When you begin to internalize the CPS process, you start seeing how to move naturally between steps, which may or may not be in a linear way. As CPS becomes part of your own way of thinking, you will understand that you can use the steps—or any one step—as you need and when you need.

CPS in Brief: "Toy City" Case Study

CPS is powerful, yet nuanced and endlessly flexible. Before we're ready to take you there, let's begin with a case study. We'll describe the essential nature of each process step, and illustrate it by talking about a very serious subject: toys. Or, more succinctly, the big business of selling toys.

The situation: A giant toy store chain, "Toy City," is in trouble. Sales are dropping, margins are being squeezed. Competition is everywhere. They decide to use the CPS process to come up with a creative solution: something novel in the industry, and something that will be valuable for the company.

For each step of the process, we will first describe the CPS process step, then show how Toy City employed that step.

Assessing the Situation

Assessing the Situation is a unique and important meta-step within the CPS process. It has two fundamental functions: data gathering and meta-cognitive.

Data gathering is using both objective and subjective data to help inform your process decisions.

We use "data" here to include a wide range of inputs and sources. Data should include objective information gathered from the five senses, such as observations, facts, descriptions, sounds, even tastes or smells; and subjective data from intuitive sources such as hunches, guesses, hypotheses, emotions, feelings, opinions, nags, or gaps in information.

Once the data is gathered, the second function of this step is to determine if creative thinking is necessary, and, if so, where to begin (or where to go next) in the CPS process. This *metacognitive* function of Assessing the Situation is to make informed choices about how to use the process. It requires you to match what you need (ideas, a better understanding of your goal, a plan of action, etc.) to the related step in the CPS process.

Assessing the Situation works much like visiting your doctor when you are not feeling well. First, the doctor gathers information, and then decides what step to take next. If she feels certain about the diagnosis, she will implement the treatment. If she is uncertain, more data will be gathered, or off you go to a specialist for further diagnosis. Assessing the Situation continues even after the treatment is initiated. The doctor or a nurse will often check to see if you are responding as anticipated, and if not, the evolving situation is examined to see whether modifications need to be made to the treatment.

In medicine, treatment follows diagnosis. In just the same manner, the way forward in the creative process


TOY
CITY
MEGASTORE

follows Assessing the Situation, which is always the first step in CPS. And just as your doctor continuously assesses progress through the various steps of a medical treatment, Assessing the Situation in CPS is never left behind. That is, Assessing the Situation occurs throughout CPS so that individuals and teams can be certain they are applying the most appropriate step of the process. This is why Assessing the Situation is referred to as the meta-step of the process; it stands above all the others—it's the eye in the sky of the CPS process.

Toy City Assesses the Situation

Assessing the Situation, the team first gathers data: sales figures for every store, region, product line, and season; and does a detailed analysis of their competitors, which include toy specialty stores, Internet-only retailers, and discount department stores. Team members visit stores, both their competitors' and their own. They go shopping for toys at every possible web site. They talk to consumers and to their suppliers. Then, they reach out a little further, visiting retail stores that are not in the business of selling toys, web sites that sell things other than toys, and web sites that don't sell anything at all but which have a lot of traffic. Finally, they go to a preschool and watch children playing with toys.

Among the issues they identify: real estate is expensive; any retailer can sell the most popular items; price-conscious buyers are selecting where to buy on price alone; toys are not sold just in toy stores; the behemoth sellers, who aren't even toy specialists, are pushing margins down as they push volume up. Some of the data is confounding. The biggest retail toy seller, who is also the biggest seller of just about everything, has a limited selection, little on-the-floor help for customers, and a toy area that is generally a mess.

Now that data is gathered, the team moves to the second function of Assessing the Situation, which is to determine where to go next. They decide to begin with the Clarification stage, which will include Exploring the Vision (what they want/need to achieve in the near future) and Formulating Challenges (identifying the issues that must be addressed to reach the vision).

Exploring the Vision

In this step, Exploring the Vision, you identify a vision of the future: a goal or wish that relates to the current situation and depicts the desired future state (i.e., the result you want to create).

First, using divergent thinking, you identify many possible future states. This requires being visionary, dreaming of a future you wish to create. It can be helpful here to use statements that begin with "It would be nice if…" or "I wish…." Then, using convergent thinking, you select

and shape the vision into one that is worth pursuing and would benefit from using CPS. At the end of this step, you will have selected a desired future state, expressed as an affirmative goal statement.

Toy City Explores the Vision

The Toy City team uses divergent thinking to produce many goal statements, from the concrete ("It would be nice if we could increase sales by ten percent in the next quarter") to the abstract ("I wish Toy City was a destination shopping experience.") Using convergent thinking, it is decided that the best expression of the chain's future vision is "We wish to increase sales by seven percent per year, every year."

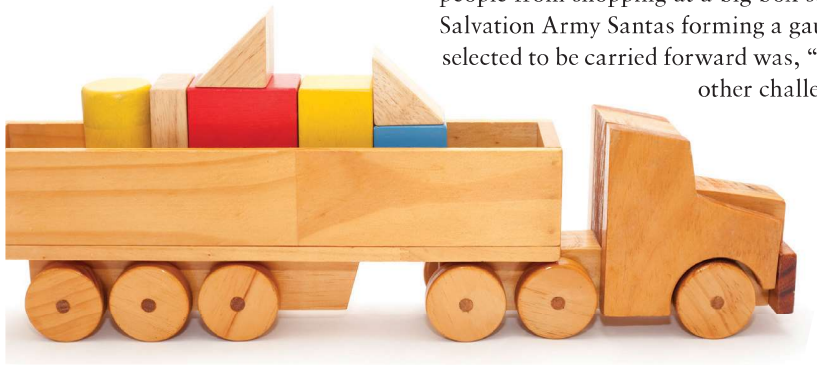
Formulating Challenges

There is, by definition, distance between the current state and the desired future state. In this step, Formulating Challenges, you begin to be strategic about how to bridge that distance.

First, thinking divergently, identify the critical issues that must be addressed, the problems that must be solved, the gaps and discrepancies, and the possible pathways. It can be helpful to begin these statements with "How to…", "How might…", "What might…", or "In what ways might…." Then, thinking convergently, select and shape these challenges into the ones that you will pursue, that is, your strategic priorities. At the end of this step, you will select one or more solution-oriented challenge statements.

Toy City Formulates Challenges

Working with a team of strong thinkers, the divergent thinking session produced nearly a hundred challenge statements, including expected questions such as "How to get our current customers to purchase more" and "How to increase same store sales," to the unexpected "How to make people love us" and "How to prevent people from shopping at a big box store." Everyone had a good laugh at the image of a hundred bell-ringing Salvation Army Santas forming a gauntlet at the big box's entrance. Converging, the challenge statement they selected to be carried forward was, "How might we get more customers into our physical stores?" (There were other challenge statements they liked, too, which would be kept aside for later.)



Exploring Ideas

Once you have identified a challenge, you need new ideas in order to meet that challenge. In this step, Exploring Ideas, you respond to the challenge statement with ideation, generating possibilities in an open, positive, and sometimes playful way.

Thinking divergently, you generate many ideas that could address the challenge. Thinking convergently, you select the most promising ideas, which you will attempt to craft into creative (novel and useful) solutions. At the end of this step, you have one or more potential ideas to carry forward.

Toy City Explores Ideas

Generating ideas was great fun for the Toy City team. Divergent thinking produced more than one hundred ideas, from the banal ("advertise more") to the outlandish ("put a store on every corner"). Building on the idea of a store on every corner, promising ideas emerged: create smaller Toy City stores; create temporary Toy City "pop-up" stores in vacant retail spaces; put Toy City stores inside of their competitors' stores; put Toy City stores inside of hospitals; put Toy City stores inside of every retail store; and so forth. Converging, the most favored ideas were those that expanded the physical presence of Toy City in a low-cost way. These were carried forward to be crafted into a comprehensive solution.

Formulating Solutions

Ideas are not solutions. They are thoughts or suggestions of a possible course of action that might be successfully crafted into solutions. In this step, Formulating Solutions, you forge a workable solution from the ideas generated in the previous step.

Thinking divergently, you evaluate the idea in various ways, including: identifying the pluses and minuses of the idea, finding ways to overcome the minuses, and developing prototypes. Thinking convergently, you make decisions about each aspect of the emerging solution, pushing development forward, while resisting premature closure (the urge to make decisions too quickly). At the end of this step, you have a robust solution for which there is a sense of commitment.

Toy City Formulates Solutions

Working with a set of ideas for expanding the physical presence of Toy City in a low-cost way, the team divergently listed the positives of the proposed solutions, then the issues that would have to be overcome. They

provided new thinking to overcome the obstacles, and used convergent tools to craft workable, implementable solutions. What they decided to do was to extend the physical reach of the store throughout the year by creating partnerships with retailers, to put Toy City mini-stores inside of their stores, including some that currently sell toys (such as department stores and amusement parks), some (such as grocery stores, hospitals, museums, and gift shops) that either dabble in toy selling or do not currently sell toys—and even some competitors' stores. They decided also to create a framework for adding hundreds of pop-up stores during the peak toy-buying seasons, and any time they see a unique opportunity. These solutions fit the criteria of providing wide reach with a low cost of entry, and an easy escape route if all or part of the program is unsuccessful.

Exploring Acceptance

Creative solutions are, by definition, changes. The intent is to introduce a new approach to an existing situation, either a predicament that needs to be resolved or a new opportunity that needs to be seized. In this step, Explore Acceptance, you evaluate context, being sensitive to the environment in which your solution will be implemented, and identify sources of both assistance and resistance.

Thinking divergently, you identify the people and resources (e.g., technology) that might assist you in bringing about the solution, and how to make the best use of them. Similarly, you identify those people who might resist, which resources (or lack thereof) could provide obstacles, and how you can mitigate or overcome them. Thinking convergently, you select which of the identified assisters and resisters require your attention, and how you will work with them. At the end of this step, you have tactics for addressing assistance and resistance, which will be incorporated into the implementation plan.

Toy City Explores Acceptance

Possible assisters were identified, with the most prominent being the toy manufacturers themselves, and commercial real estate brokers. Of the many resisters identified in the divergently-generated list, the most important ones were the higher-volume toy sellers, who may not feel the need to have an outside partner. Of the ideas generated to overcome this resistance, the two most important were a limited trial period (e.g., stores in one test city, for one quarter, with no obligation to continue), and encouragement (in the form of incentives) from the primary assisters, the toy manufacturers.

Formulating a Plan

Successful implementation requires planning. In this step, Formulating a Plan, you are tactical, identifying what needs to be done and how it will get done, all while remaining cognizant of, and tolerant of, the risks that come with creative change.

Thinking divergently, you identify all the possible action steps required to implement the solution, including what needs to be done, by when, and by whom. Thinking convergently, you organize these steps into a comprehensive implementation plan, the structure of which is determined by the type of project. At the end of this step, you are ready to implement the creative solution.

Toy City Formulates a Plan

Toy City created a new function inside of its marketing group to pursue strategic partnerships; formed an ad hoc team in its real estate group to locate temporary space options and negotiate leases; and asked Human Resources to create a training program for the employees of partner stores that would now be selling Toy City products. Detailed action plans were created by each group, with each initiative having its own plan and project manager. Budgets and targets were established, and the implementation work was ready to begin.

CPS in Brief, Debrief

In this section, we walked you through CPS step-by-step, describing each process step both generically and in the context of a fictional example. This allowed you to see CPS both in whole and in part, which we hope suggests to you that you can use CPS both in whole (every process step), and in part (only the steps that are needed). Table 1 provides a summary of the process steps.

Overview of the CPS Process Steps

Step	Purpose	Divergence	Convergence	Exit with...
Assessing the Situation	To describe and identify relevant data.	Generate a large amount of data by asking and recording answers to questions that will help you gather information from sources both objective (observations, facts, sensory elements) and subjective (hunches, feelings, opinions).	Select the most important data, i.e., the information that looks most relevant to the situation you are facing. You can also cluster the data and label each cluster to help organize and make sense of it.	At the end of this step, you will have a clear picture of the most relevant data that characterize the situation you are facing.
	To determine the next process step.		Determine if the problem identified is a good match for the CPS process; if so, make a decision about where to go next in the CPS process.	At the end of this step, you will have a decision whether or not CPS is the right approach for the situation and, if so, a direction (where to go next).
Exploring the Vision	To develop a vision of a desired outcome.	Generate a list of goals, wishes, challenges, and opportunities. Begin each with an affirmative statement starter: "I wish..." or "It would be nice if...."	Select the statement that best identifies the vision; improve the statement, if needed, until it expresses precisely the desired future state.	At the end of this step, you will have a goal, wish, challenge, or opportunity, expressed as a broad, brief, and beneficial statement that begins with one of the statement starters.
Formulating Challenges	To identify the gaps that must be closed to achieve the desired outcome.	Generate a list of problems that need to be solved in order to achieve the vision. Begin each with an affirmative statement starter: "How to...," "How might...," "What might...," or "In what ways might...."	Select the statement that best expresses a problem that needs to be solved in order to reach the desired future; improve the statement, if needed, until it expresses the problem precisely.	At the end of this step, you will have one or more problems you wish to work on, in the form of concise, affirmative statements that begin with one of the statement starters.
Exploring Ideas	To generate novel ideas that address important challenges.	Generate many ideas for solving the problem.	Select the most promising ideas, remembering to keep novelty alive.	At the end of this step, you will have one or more ideas which can be developed into implementable solutions.
Formulating Solutions	To move from ideas to solutions.	Generate a list of pluses, potentials, concerns, and ways to overcome the concerns; create prototypes to test the solution.	By accepting and rejecting various aspects of the developing solution, make incremental improvements to the potential solution.	At the end of this step, you will have created an implementable solution.

Step	Purpose	Divergence	Convergence	Exit with...
Exploring Acceptance	To increase the likelihood of success	Make a list of potential sources of assistance and resistance. Include people, resources and circumstances (timing, location, etc.)	Identify key assisters and resisters. List ways to overcome key resisters and ways to take advantage of key assisters.	At the end of this step, you will have determined how to enlist assisters and overcome resisters, so that you are ready to create an implementation action plan.
Formulating a Plan	To develop an implementation plan	Generate a list of everything that will need to be done, including these details for each action: what needs to be done, who will do it, when it needs to be done, what steps precede it, and who is notified upon completion. Include steps that involve acceptance (the work you did on assisters and resisters) from the previous step.	Review the list of action items. Remove those that do not need to be included in the plan, and combine steps that should be combined. List the action items in order, from start to finish, along with the pertinent details.	At the end of this step, you will have a fully-formed action plan for implementation of the solution.

Moving Forward

CPS is a process that helps people re-define the problems they face, come up with creative ideas, transform them into workable solutions, and then take action on them, thereby leading to productive change. In its "pure" form, a creative project travels through each process step, but that's not the only way it happens. Many endeavors require just one or a few steps; and some more complex situations result in an organic process that iterates, backtracks, changes direction, and goes where it needs to go. It is the function of Assessing the Situation to guide the process. The skilled CPS practitioner uses the flexibility of the process, rather than being bound by it.

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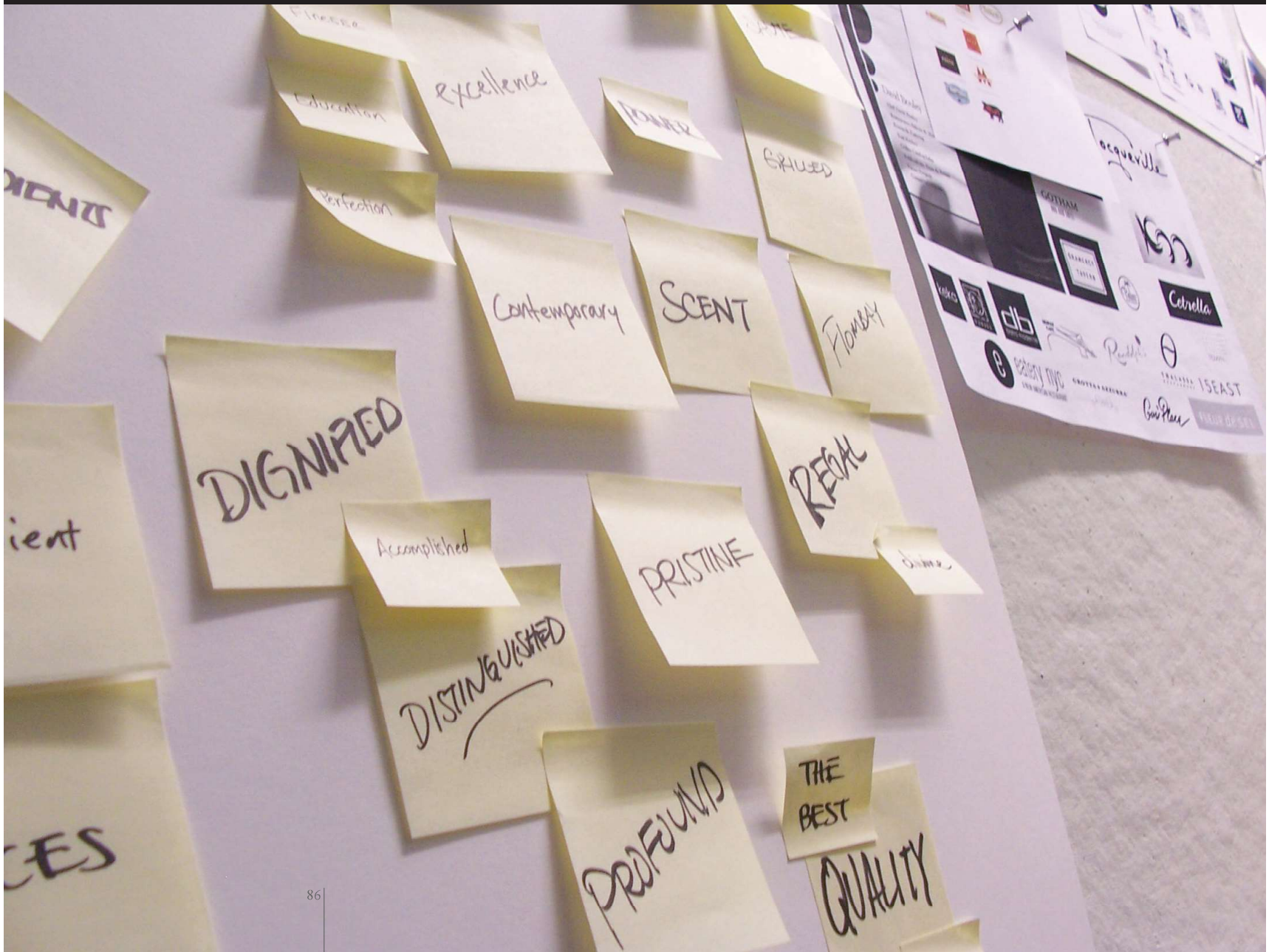
[1] Puccio, et al., 2011, pp. 29-30.

[2] Puccio, et al., 2011.

[3] Puccio, G. P., Murdock, M., & Mance, M. (2007). *Creative leadership: Skills that drive change*. Thousand Oaks, CA: Sage, p. 28

[4] Puccio, G. P., Murdock, M., & Mance, M. (2005). Current developments in creative problem solving for organizations: A focus on thinking skills and styles. *Korean Journal of Thinking & Problem Solving*, 15, 43-76.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