*Chapter* ***15***

# Management: Synchronizing Different Kinds of Creativity


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### Introduction

How do people think, work and act creatively in diverse domains? Is creativity a general attribute or do different kinds of creativity apply in different domains? These are the main themes of this book. This chapter suggests that not only are there different kinds of creativity, but also that there are different kinds of creativity within the domain of management. This is because there is a need for different kinds of creativity within various kinds of work and jobs in organizations. "Applied creativity" may be viewed as a process with multiple stages or phases. Different kinds of creativity are associated with the various phases or stages of the process. Within organizations, different kinds of work favor specific kinds of creativity, which must be synchronized to achieve innovative results for profitability and competitive edge. What does this process of applied creativity involve?

### Different Approaches to Creativity

Studying and discussing creativity can be difficult and complex, both because no single, agreed-upon definition of this quality exists and because researchers have taken many different approaches to studying it. Under the *identification* approach, Guilford (1967) and MacKinnon (1962; 1977) developed cognitive, aptitude and personality tests to identify relatively more or less creative people. Others have studied *organizational factors* that are likely to inhibit or nurture creative performance (such as goals, incentives and freedom from time pressure (Baker, Winkofsky, Langmeyer and Sweeney, (1976)). A third approach involves *deliberate*


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*improvement*: can we train people and make them "more creative" or better able to use their innate creativity (Parnes, Noller and Biondi, 1977; Basadur, Runco and Vega, 2000)?

Researchers have begun to organize the study of creativity into the four "Ps": product, press (environmental factors), person, and process (Murdock and Puccio, 1993). For example, some researchers (e.g., O'Quin and Besemer, 1989) study creative products: What makes a more or less creative product, from a car to a story? Jackson and Messick (1964) identified four criteria to measure the creativity of a product. Besides being unusual, they said, the new product must be appropriate. The product must also be transformative: Does it make us think about the world in a different way? And it must convey "condensation": Does this product feel fresh every time you use or encounter it? Researchers studying "press" have examined environmental factors that can induce creativity in organizations (Amabile and Gryskiewicz, 1989). Others study personal characteristics related to creativity. For example, Kirton (1976) differentiated between people with more "adaptive" styles of creativity and people with more "innovative" styles of creativity, and Myers (1962) addressed the relationship between personality and creative behavior.

**The Process Approach to Applied Creativity**

Still others focus on modeling creativity as a process with steps, phases or stages. Inherent in this approach is the idea that people may follow a process to increase creative performance and to communicate more efficiently with others in creative teamwork. Taking the process approach, Kabanoff and Rossiter (1994) defined applied creativity as "occurring in a real-world, industrial, organizational or social context; pertaining to the finding or solving of complex problems; and having an actual behavioral creative product (or plan) as the final result." They said that applied creativity is vital in several fields, including science (inventive research and development), business (new product innovation and management), government (administrative planning for more heterogeneous and globalizing societies), and the arts (cultural and aesthetic developments). In fact, organizations in any industry may benefit from applied creativity. (Certainly, applying creativity to increase profitability is far more satisfying than the alternative route of cutting costs and paying the attendant penalty in unemployment.)

**Cognitive Process Models**

Several other researchers have written about cognitive models of the process of creative thinking and problem solving, all involving a sequential flow through specific stages, phases or steps. Kabanoff and Rossiter (1994) reviewed the growth of cognitive models of multi-stage creative thinking and problem solving processes beginning with Wallas's (1926) four main stages: preparation, incubation, illumination and verification. Parnes, Noller and Biondi (1977) identified five steps: fact finding, problem finding, idea finding, solution finding and acceptance finding. To that model, Isaksen and Treffinger's (1985) model added an extra step called "mess finding." Amabile (1988) also identified five stages: presentation, preparation, generation, validation and assessment. Basadur, Graen and Green's (1982) model of applied creativity is a circular, three-phase process of finding good problems, solving them and implementing good solutions (Basadur, 1992). All of these models represent a sequential flow through specific stages, phases or steps. Figure 15.1 shows a three phase circular model of creative activity in an

organization which continuously cycles through problem finding, problem solving and solution implementing phases (see Basadur 1992; 1997).

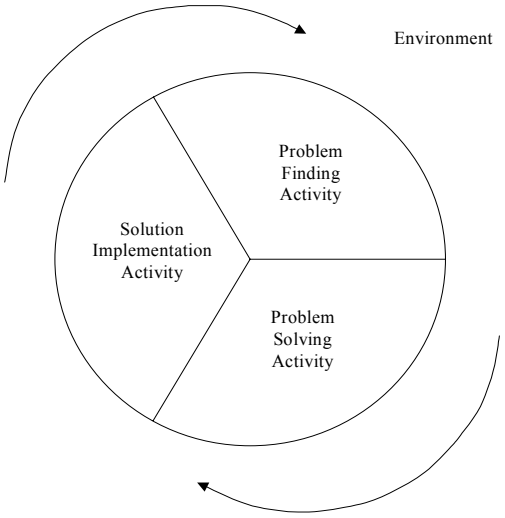



Figure 15.1: Creativity activity in an organization

## Problem Finding

*Problem finding* means continuously and deliberately discovering and formulating new and useful problems to be solved. Most researchers recognize that creativity requires more than the generation of a variety of ideas in response to a cue, and often does not begin with or depend on "given information." Guilford (1950) stressed the importance of "sensitivity to problems" in creativity and related it to our everyday notion of curiosity. Wakefield (1991) contrasted one type of thinking – "single open" problems, whose definition is *closed* but whose solution is *open* – with another type of thinking involving "double open" problems, or first formulating a previously undefined problem and then generating alternative solutions. Others have emphasized that discovering and defining new important problems to solve (problem finding) and implementing new solutions (solution implementation) is as important as or even more important than creating the new solutions (problem solving) (Mackworth, 1965; Livingston, 1971; Getzels, 1975; Leavitt, 1975; Simon, 1960, Levitt, 1963; Ackoff, 1979). Basadur (1979) and Basadur, Graen and Green (1982) provided empirical evidence that attitudes, behaviors and skills associated with problem finding were distinctly different from those associated with problem solving and that such attitudes, behaviors and skills can be successfully learned in appropriate training.

Kabanoff and Rossiter (1994) cited problem finding as one of the most vital and difficult frontiers for creativity researchers – a "messy" concept that is hard to define and use. Problem finding is a crucial element of creativity, especially real-world creativity in applied settings. Basadur, Ellspermann and Evans (1994) identified two separate components of problem finding

activity. The first component is problem generation, which involves discovering new problems for subsequent definition. This is similar to what Simon (1977) called "opportunistic surveillance." Edwin Land (1972) attributed his invention of the Polaroid camera to his unexpected finding of a problem (how to obtain instantaneous pictures), not its subsequent solution. The second component involves formulating a previously discovered but undefined problem. This second component is called *problem formulation* (or conceptualization, or definition). Land further stated that "if you can define a problem, it can be solved," and Dewey suggested that a problem well stated is half solved. Albert Einstein is reputed to have said that, given an hour to solve a problem to save the world, he would devote 55 minutes to defining the problem, and only five minutes to solving it.

**Solution Implementation**

As for *solution implementation*, Edison also said that genius is one per cent inspiration and 99 per cent perspiration. Similarly, Osborn (1953) once said that "a fair idea put into practice is better than a good idea left on the polishing wheel." The world is full of people who have great ideas but are unable to take them through to completion. How can an artist claim to have been creative without yet having drawn the picture? Indeed, an entire industry has recently emerged that consists of small consulting companies with one function: to help larger organizations put ideas into practice and move projects through to completion. Many researchers, including Leavitt (1975) and Basadur et al (1982), identify the process of overcoming resistance to change and procrastination as an important part of creative thinking.

**More than just Generating Ideas**

These viewpoints contrast sharply with research that confines creative thinking merely to generating ideas to presented problems using techniques such as "brainstorming." Such research dominated the literature from the 1950s into the 1980s (see review by Basadur, 1994). Practitioners who employ such limited conceptions of creative thinking seldom attain practical results (Sternberg, O'Hara and Lubart, 1997). More recent literature contains more complete conceptions of applied creativity (Kabanoff and Rossiter (1994); Rickards (1994); Basadur (1995)). Such complete models include not only multiple stages (beyond simply solving presented problems) but other important individual, group and organizational variables affecting creative performance such as motivation, cohesiveness, environment, linkage to goals, and specific skills, behaviors and attitudes.

**Four Distinct Stages**

Basadur and Gelade (2002) provide a theory of applied creativity consisting of four stages: generating, conceptualizing, optimizing and implementing. In each of these stages, people gain and use knowledge and understanding in varying ways, as illustrated in Figure 15.2. Each quadrant in the Figure corresponds to a specific stage of the creative process. The first two quadrants represent the components of problem finding: generation and conceptualization. The third and fourth quadrants represent problem solving (optimization) and solution implementation as the final two stages of the creative process.

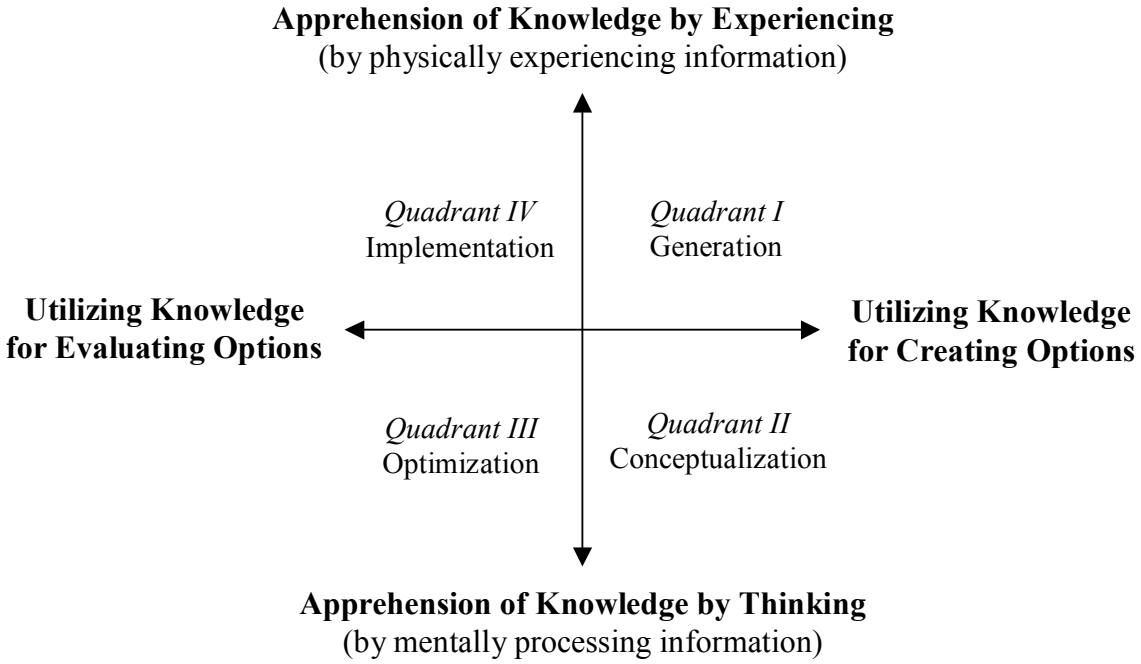



Figure 15.2: Four combinations of different methods of gaining and using understanding

**Quadrant I**

The first quadrant gets the creative process rolling. Here creative activity includes gaining knowledge and understanding by physical contact with and involvement in real-world activities and utilizing this knowledge to create new problems, challenges, opportunities and projects that might be worth defining and solving. Understanding is derived from what is experienced, including emotions and feelings of self and others through empathy. New possibilities are imagined from what is experienced. Quadrant I activity thus consists of sensing, seeking or anticipating problems and opportunities, and is called *generation*.

An outcome of this stage is a problem worthy of investigation but not yet clearly defined or understood. In a *Life* magazine cover story, Edwin Land explained his invention of the Polaroid camera. Having snapped the last exposure on his film, he suggested to his three-year-old daughter that they take the film for processing so that they could see the pictures in about a week's time. Her frustrated response was: Why do I have to wait a week to see my picture? Like a flashbulb going off in his mind, her simple question sparked a challenge that had never occurred to him: How to make a device that yields instantaneous pictures? Within about an hour, he had formulated several directions toward a solution. And within about four years, he had commercialized a product that has changed our lives. Looking back, the then-chair of Polaroid

said the most important part of the process was not finding the solution itself (the camera) but finding the problem: how to get instantaneous pictures. Had Land not experienced the chance encounter, he might never have created the problem to be solved. He demonstrated the generation stage of the creative process: initiating problems to be solved instead of waiting for the problems to be provided.

At Japan's electronics giant Toshiba, most engineers and scientists beginning their careers in research and development start off in the sales department (Basadur, 1992). This apparently backward approach is designed to teach them the process of problem finding. As these people will spend their working lives creating products to solve customers' problems, what better start than to learn first-hand about those customers' needs, habits and problems – both visible and hidden? A major auto parts supplier, Nippondenso, trains and encourages employees from day one to find problems and to be discontented with their jobs. Employees write down their discontents and post them for workers to read. Here and at many other Japanese companies, this is actually the start of the creative process called the *employee suggestion system*. The entire suggestion system hinges on problem finding.

**Quadrant II**

The second quadrant, conceptualizing, keeps the creative process going. Creative activity in this quadrant involves gaining knowledge and understanding mentally, working in the abstract, analyzing, pondering and theorizing about the information received to create a sound conceptualization or model of the problem domain. Understanding is gained not by direct experience but by detached, abstract thought. What is understood through rational, systematic analysis is turned into new insights that help define problems and create theoretical models and ideas to explain things. Quadrant II activity consists of turning a problem recognized in Quadrant I into a well understood problem definition and some fledgling solution ideas and, thus, is called *conceptualization.*

For example, a Procter & Gamble product development team formed at short notice once asked me to help them respond to a competitor's new product. Colgate's green-striped Irish Spring had been the first striped soap bar introduced to North America. With its aggressive advertising campaign emphasizing "refreshment," Colgate's new product was finding ready customer acceptance. Procter & Gamble worked by the rule that, if a team or person were the second entrant into a new market, it had to demonstrate a product's competitive advantage before it could carry out a market test. When asked what was going wrong, the team members said they had been unable to produce a green-striped bar that worked better than Irish Spring in a consumer preference blind test. The team had experimented with several green-striped bars, all of which had merely equaled Irish Spring in blind testing. It became evident that the team had chosen to define its problem as: How might we make a green-striped bar that consumers will prefer over Irish Spring?

During a creative problem solving meeting, one of the important activities was to develop alternative ways to define the challenge. The flash of inspiration came from an answer to a question posed from a consumer's point of view: We want to make a bar that makes people feel more refreshed. This led to the new conceptualized challenge: How might we better connote

refreshment in a soap bar? This less restrictive conceptualization, which included no mention of green stripes, provided more room for creative solutions. The team broke this new problem into a conceptualization with three separate components – How might we better connote refreshment in appearance, shape and odor? – and then focused their imaginations on ideas. Beginning with the product's appearance, the team members visualized scenes, images and situations that suggested refreshment. One pictured himself at the sea coast. Another imagined sitting on a beach and looking at a blue sky and white clouds. Later, when the team evaluated its many ideas, these two ideas were selected and combined. The result was the concept of a blue-and-white swirled bar with a unique odor and shape. The concept later achieved market success under the brand name Coast. By leaping prematurely into solutions, the team had wasted almost six months before coming up with a superior conceptualization.

**Quadrant III**

The third quadrant moves the creative process further. Creative activity in this quadrant involves gaining knowledge and understanding mentally by working in the abstract – thoroughly analyzing a defined problem and utilizing this knowledge to develop and evaluate ideas and options and create an optimal, practical solution. What is understood through rational, systematic and orderly analysis is used to mentally evaluate situations and options to convert abstract ideas into practical solutions and plans. Quadrant III activity is called *optimization*. At this point, a good solution to an important, well-defined problem exists, but has not yet been implemented. For example, the newly defined concept of a refreshment bar in the example above still had to be converted into a practical solution. The team's engineers created and evaluated several optional versions of the new appearance, odor and shape. The options were evaluated on several criteria including cost, feasibility and time to implement. A final optimal prototype was chosen and successfully tested with consumers, showing an exploitable competitive advantage over its competitor.

**Quadrant IV**

The fourth quadrant completes the creative process. Apprehension in this quadrant involves gaining knowledge and understanding by physical contact and involvement in the real world. Utilization consists of employing evaluation to convert this knowledge into implemented solutions that work, accomplish valuable results, and are accepted by others. What is experienced and felt is used to evaluate. Creative activity in this quadrant consists of gaining experience with new solutions, evaluating the outcomes and making adjustments to successfully implement them. Thus this stage is called *implementation*. For example, in the refreshment bar example, the team was still not finished. Before the new soap formula could be sold, a patent problem in the machinery design had to be overcome. There were already no fewer than six worldwide patents restricting how blue and white soap pastes could be blended. The team had to find a machine design to make the new product without infringing on anybody else's technique. The team assembled diverse points of view in a special group of engineers, technicians, lawyers and even a few people who were unfamiliar with this technology. Sketches and prototypes of the patented processes were displayed and examined until a breakthrough insight emerged. The equipment was adjusted and rebuilt repeatedly until the new product was produced satisfactorily for delivery for purchase. A full cycle of the creative process was now complete.

## Applied Creativity as Circular and Never-ending

Gordon (1956, 1971) also recognized that apprehension (learning) and utilization (for inventing) represent two different modes of thinking. Invention was characterized as a mental process of breaking old connections, or making the familiar strange (similar to generation and conceptualization) while learning was characterized as a mental process of making new connections or making the strange familiar (similar to optimization and implementation). These separate processes of knowledge application (for inventing) and knowledge acquisition (learning) flow continuously into one another in sequence. Field research by Carlsson, Keane and Martin (1976) supported Gordon's approach by showing that the research and development process in organizations follows a continuous, circular flow of creating new knowledge to replace old knowledge.

Based on extensive field research and practical experience within business organizations (Basadur, 1974; 1979; 1981; 1983) consistent with Gordon's theory and Carlsson, Keane, and Martin's empirical evidence, we can understand the creative process as an ongoing cycle. Here the different stages of the creative process are arranged in a circle, recognizing that as new problems are sought, discovered and defined, and new solutions subsequently developed, optimized and implemented, new problems and opportunities arise. For example, the automobile's invention provided not only a new solution to an old problem (improving transportation) but created many brand-new problems (e.g., pollution, energy and accidents).
This circular process, which emphasizes continuous creativity beginning with problem finding, reflects Mott's (1972) research which showed that effective organizations continually and intentionally scan the external environment to anticipate new opportunities and problems, and to proactively change their routines and find new products and methods to implement, thus leapfrogging their competitors. Each implemented solution leads to new, useful problems to be discovered. This concept, called *adaptability*, may be represented as a continuous four-stage process of creativity as shown in Figure 15.3.

## Different Stages and Different Kinds of Creativity

If we consider creativity as a multi-stage synchronized process, then might people differentially favor or prefer various stages of the process requiring different aspects of creativity? And might those differences be reflected in their occupations, with certain kinds of jobs favoring certain parts of the process: generation, conceptualization, optimization, implementation? Furthermore, do people draw on different kinds of creativity as they advance through an organization, particularly into higher management ranks? There is evidence to suggest an affirmative answer: that creativity differs in kind, both among job types and within organization levels.

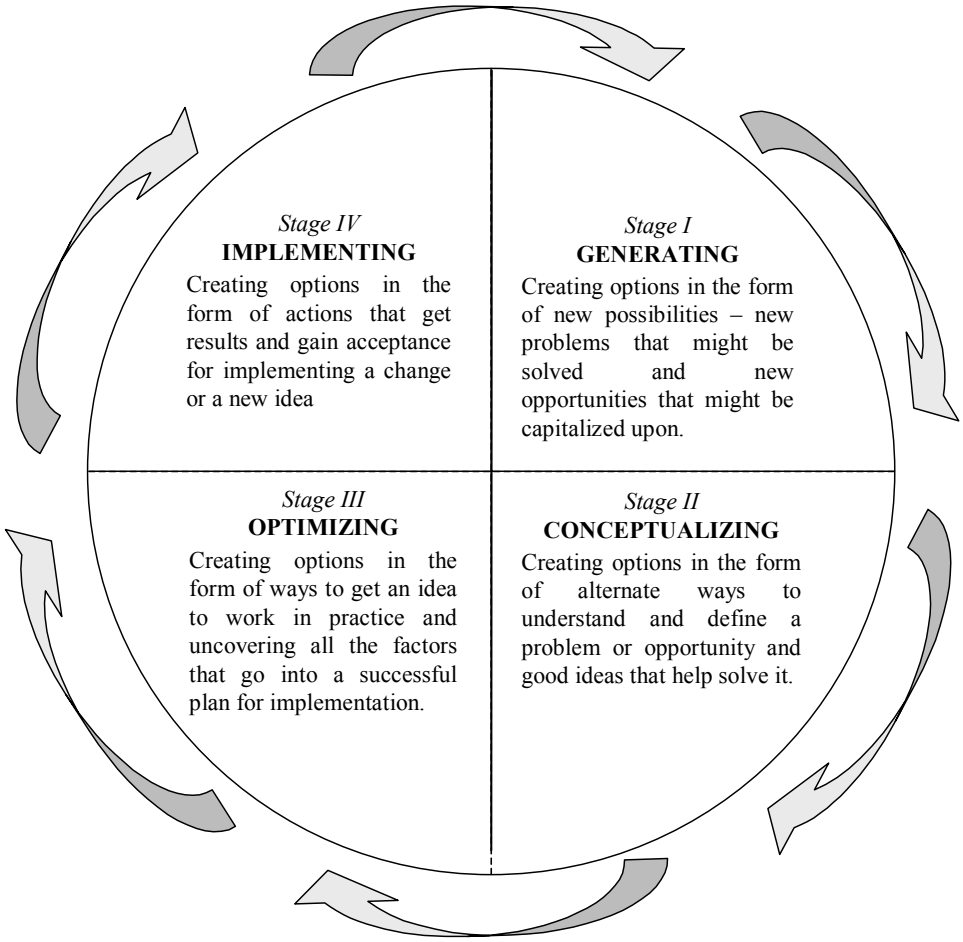



Figure 15.3: The four stages of the creative process

To determine individuals' relative preferences for each of the four stages, an instrument called the *Creative Problem-Solving Profile (CPSP) inventory* has been developed (Basadur and Gelade, 2002). By returning to those quadrants of Figure 15.2, individual preferences for each of the four stages of the creative process can be established by considering differences in how people both gain (apprehension) and use (utilization) knowledge. Again, the first quadrant combines gaining knowledge through experience with using knowledge for creating options. Quadrant I activity corresponds to generation, and yields a problem worthy of investigation but not yet clearly defined or understood. The second quadrant combines gaining knowledge by mental processing with using knowledge for creating options. Quadrant II activity consists of turning a problem from Quadrant I into a well understood problem definition and some fledgling solution ideas and is called *conceptualization*. The third quadrant combines gaining knowledge by mental processing with using such knowledge for evaluating options. This stage, called *optimization*, yields a good solution to an important, well-defined problem. The fourth quadrant combines gaining knowledge by experiencing with using such knowledge for evaluating options. In this stage, called *implementation*, an untried solution is implemented. Plotting the scores obtained from the CPSP inventory and connecting them yields an irregular shape or profile, as in

Figure 15.4. As the figure shows, dominant quadrants are identified that describe an individual style or profile of the creative process.

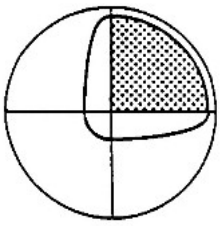
In a creative organization, everyone is responsible for doing at least one of the four stages defined by Figure 15.3. Some people initiate new things. Some are responsible for understanding and defining new initiatives and planning. Some produce practical solutions to new problems and initiatives. Others are responsible for finishing things off – taking action to implement new solutions. If the four-stage process of creativity outlined above adequately represents the creative process, it would be expected that teams with a heterogeneous mix of preferred creative process styles (Figure 15.3) would significantly outperform teams with a homogeneous mix of creative process styles in innovative work, because in the former case, all stages of the process are readily available within the team. One could also predict that members of homogeneous teams would experience more satisfaction working with their team-mates because they are interacting with like-minded people. These predictions have been verified (Basadur and Head, 2001).

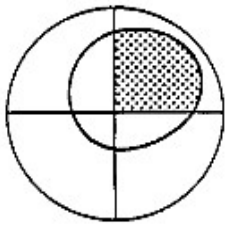
In addition, an individual's preference for a certain stage of the creative process should be predicted by the main ways in which that individual gains and uses understanding, as depicted in Figure 15.2. The combination of ways in which individuals gain and use knowledge should also lead them toward certain fields of endeavor, or occupations.

Examples of a Dominant Generator Style

Examples of Different Dominant Styles

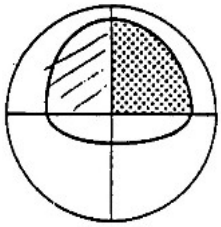
Generator style dominant with all three other quadrants relatively small.

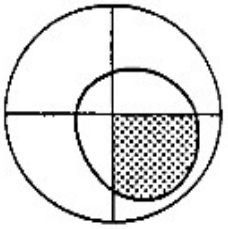




Generator style dominant with all three other styles relatively small.

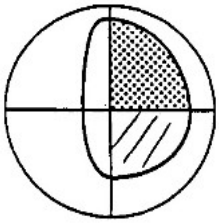
Generator style dominant with Implementer style as strong secondary.

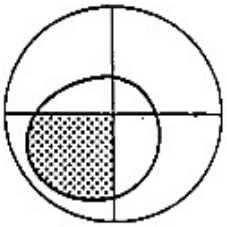




Conceptualizer style dominant with all three other styles relatively small.

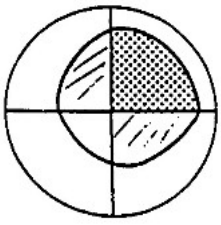
Generator style dominant with Conceptualizer style as strong secondary.

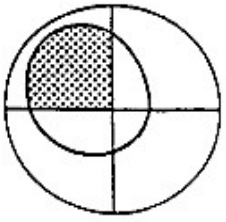




Optimizer style dominant with all three other styles relatively small.

Generator style dominant with Conceptualizer and Implementer as secondary styles of significant and equal strength.





Implementer style dominant with all three other styles relatively small.

Figure 15.4: Examples of different creative problem-solving profiles

**Kinds of Creativity and Occupations**

Perhaps the most influential career development theory in occupational psychology is Holland's (1985) theory of vocational personalities and work environments. According to this theory, people and work environments can be meaningfully classified into different types and "people search for [work] environments that will allow them to exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles." The occupation that people will find most satisfactory, and the one in which they will be the most successful, is the one that maximizes the congruence between the demands of the work environment and their vocational personality. Therefore we might expect to find certain occupations to be disproportionately populated by individuals with a matching creative problem-solving style.

Occupations that require people to initiate change, recognize opportunities and new possibilities, start projects, and to work with people in unstructured situations might thus be expected to contain a relatively high proportion of generator (Quadrant I dominant) individuals. Typical occupations here would be the artistic and academic professions, training and teaching, and marketing. Similarly, fields such as strategic planning and research and development, where defining problems, understanding situations, and creating direction and strategy are important, might be expected to contain a relatively high proportion of conceptualizers (quadrant II dominant). Quadrant II activity would likely typify fields such as market research, organization development, strategic planning, R&D scientist, university professor/researcher and senior systems consultant. Quadrant III (optimizer) activities involve solving problems with precision and evaluating and optimizing products and procedures. This should be characteristic of fields such as engineering/engineering design, IT systems development, finance and accounting. Quadrant IV (implementer) fields would likely emphasize shorter-term implementation work, such as sales, manufacturing production, secretarial or administrative support, and project management.

Empirical research bears out these predictions. The CPSP styles associated with different occupations are most clearly seen in Table 15.1. In the first column of Table 15.1, the occupations are ranked (in descending order) by the percentage of Generators in each. Thus the occupation with the highest proportion of Generators is School Teacher, and the occupation with the next highest proportion is Academic, followed by Artistic. In the second column, occupations are ranked by the percentage of Conceptualizers. The occupations that contain the highest proportion of Conceptualizers are Organization Development, Strategic Planning and Market Research. In the last two columns occupations are ranked by the percentages of Optimizers and Implementers respectively. Inspection of these two columns shows that the occupations that contain the most Optimizers include Engineering, Finance, and IT Systems Developer, and the occupations that contain the most Implementers include IT Operations, Customer Relations, Secretarial/Administrative Support, Project Manager, Sales and Purchasing. Certain occupations appear in more than one column because they rank highly in more than one quadrant.

These results generally support the idea that an individual's occupation matches his or her preferred creative problem solving style. Perhaps individuals with certain CPSP styles are attracted to the kinds of jobs that emphasize their innate preferences. Or perhaps an individual's natural preferences are modified by exposure to work experiences that reward types of cognitive

Table 15.1
Ranking of Occupations by Percentages of CPSP Styles

| Rank | Generators | Conceptualizers | Optimizers | Implementers |
|---|---|---|---|---|
| 1 | School Teacher | Organization Dev. | Engineering/Eng. Design | IT Operations |
| 2 | Academic | Strategic Planning | Manufacturing Engineering | Customer Relations |
| 3 | Artistic | Market Research | Finance | Secretarial/Admin |
| 4 | Non-Profit/University Admin. | Design | IT Systems Developer | Project Manager |
| 5 | Training | R&D | IT Programmer/Analyst | Sales |
| 6 | Marketing | Artistic | Accounting | Purchasing |
| 7 | Design | Product Development | Strategic Planning | Manufacturing Production |
| 8 | Health Management Executive | IT Senior Consultant | Technical Customer Support | Logistics |

*Note:* Occupations ranked 1 contain the highest percentages of the relevant style.

activity appropriate to the job. These occupational differences are also consistent with the dynamic flow of the four-stage creative process. Typically in an organization, ideas for new products to meet emerging customer needs and problems originate in the marketing department, which contains a high proportion of generators. Market research and design departments then articulate the product more clearly, and assess its market potential. These occupations contain a high proportion of conceptualizers. Next, engineers develop prototypes for field testing with consumers and establish optimal specifications. Engineering occupations contain a high proportion of optimizers. Finally, the production department manufactures the product for logistics to distribute and sales to sell. These three occupations contain a high proportion of implementers.

**Kinds of Creativity and Organizational Levels**

A similar relationship might be found between dominant CPSP style and organizational level. Increasing levels of responsibility are defined as non-management, first-line supervision, middle management, and upper management. As individuals assume increasing levels of responsibility in an organization, the less important it is to implement day-to-day operational tasks and the more important it is to create vision and policy, to think strategically about the future, to conceptualize the "big picture", and to define problems and goals for others to solve and achieve. These activities are characteristic of stage II of the creative process depicted in Figure 15.3. According to this logic, one might expect to find a higher proportion of people preferring stage II activity (Conceptualizers) at higher organizational levels than at lower levels. One might further predict that a higher proportion of Conceptualizers would be found amongst highly specialized technical and professional workers, including economists, scientists and planners, who are employed by their organizations primarily to <u>think</u> rather than to execute.

Empirical research bears out these predictions. The CPSP styles associated with different organizational levels are shown in Table 15.2. For each level, Table 15.2 reports the percentage of individuals preferring each CPSP quadrant or process stage.

Table 15.2
Percentage of Individuals Preferring Each CPSP Quadrant by Organizational Level

| | | *Percentage Preferring* | | | |
|---|---|---|---|---|---|
| | *n* | *Generation* | *Conceptualization* | *Optimization* | *Implementation* |
| *Organizational Level* | | | | | |
| Non-manager | 449 | 19.4 | 16.9 | 22.3 | 41.4 |
| Supervisor/Team Leader | 1073 | 19.9 | 17.3 | 21.8 | 40.9 |
| Middle Manager | 843 | 19.5 | 24.4 | 22.3 | 33.8 |
| Upper Manager | 357 | 17.9 | 35.9 | 17.4 | 28.9 |
| Technical/Professional | 1061 | 22.8 | 30.2 | 23.3 | 23.8 |

*Note*: n=base size

As predicted, the percentage preferring conceptualization increases and the percentage preferring implementation decreases with increasing levels of strategic thinking responsibility. The percentages preferring generation and optimization, on the other hand, are relatively stable across organizational level. At the non-management and supervisor/team leader levels, there is a very large gap between preference for implementation (much higher) and preference for conceptualization (much lower). At the upper manager level, this gap is much reduced, with preference for conceptualization becoming slightly higher than preference for implementation. This indicates that as a person rises through the ranks, he or she develops an increasingly higher level of preference for conceptualization at the expense of preference for implementation.

**Where are the Generators?**

One particular creative thinking style bears greater consideration by organizations. The distribution of respondents in this study by preferred creative process stage was: generator, 20.1 per cent; conceptualizer, 26.2 per cent; optimizer, 21.7 per cent; and implementer, 32.0 per cent. Interestingly, individuals preferring the generator style were predominantly found in non-industrial occupations. Few business or industrial occupations in this study had a high proportion of generators. This finding is perhaps the most provocative for business and industry, whose most perplexing challenge today is how to be more innovative in the face of accelerating change. Indeed, many leading management consultants exhort corporations to "begin their revolutions" – to expand their thinking and do things differently. Improving current methods and procedures is no longer sufficient, they say. Instead, they advocate deliberate change and advise corporations to explore new markets rather than defend old ones. The new rules seems to be "if it ain't broke, break it anyway." While many corporations find this an appealing strategy, they also find it difficult to implement. Perhaps one reason for this difficulty is the lack of employees with a preference for the generator style of thinking. If indeed organizational success depends so critically on deliberate change, and if Holland's theory of vocational choice is correct, why are employees with generator characteristics apparently under-represented in business organizations? Perhaps many companies have yet to learn how to retain and motivate individuals who prefer the generator style. Generators are the furthest away from the work that is visibly measurable. In

contrast to people in sales and manufacturing, for example, generators do not produce tangible and measurable results such as sales completed or goods produced. Rather, they initiate work that others carry forward and complete. Maybe organizations find it more difficult to recognize their contributions and reward the kind of work they do.

**Summary**

Gone are the days when a company could assign "creative work" to a select group of people, say, in the marketing or research and development department. Today much more complex challenges posed by globalization of competition and technological advancement make it imperative for organizations to solve problems and capitalize on opportunities, and that requires the creativity of all the organization's members, across multiple disciplines. No longer can the creative process be seen as a "relay race," with one department handing off pieces of a problem to the next. Rather than wait for others to "do their job first," each department must be involved from the beginning throughout the stages of the creative process. By blending different kinds of knowledge and various kinds of creativity, the entire organization implements new solutions to newly discovered, well-defined problems and opportunities, both more rapidly and more successfully.

The research reported here supports this point of view. Recognizing the need for different kinds of creativity within various kinds of work and jobs in organizations has been the main theme of this chapter. Creativity has been portrayed as a multi-stage process, and moreover, a process with an "applied" focus. Managers and other organizational leaders must recognize, nurture, reward and synchronize the different kinds of creativity associated with the various stages of the creative process. Evidence has been provided that within organizations, different kinds of domains of work favor different kinds of creativity. These different kinds of creativity are equally valuable and must be synchronized effectively to produce a continuous supply of innovative results. Different parts of organizations tend to prefer different stages of the creative process thus they contribute differently to the creative process. Thus, in the world of organizational managing, rather than thinking of management as a single "domain", it should be realized that there are many different domains within the management of organizational work. Perhaps even more importantly, the different domains require different kinds of creativity.

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