Core Knowledge Area Modules Number 3

The dynamics of collaborative creative thinking for modern American corporate organizations

Student: Benjamin Cheung

Faculty Mentor: Dr. Teresa Bittner

Faculty Assessor: Dr. Louis Taylor

Walden University

December 9, 2007

Breadth Abstract

The Breadth section of this KAM includes the identification and exploration of the dynamics of collaborative creative thinking in modern American corporate organizations. The goal is to identify and evaluate the principle dynamics that either foster or inhibit the production of creativity. The theories of P. M. Senge, T. M. Amabile, and D. Katz are evaluated and compared for insight. After careful analysis of eminent theorists, the conclusion is that autonomy, freedom, control, & choice, challenge & task involvement, climate, collaboration, communication, & synergy, encouragement, reward & recognition, flexibility & versatility, goals & values , management support & motivation, sufficient resources & time, brainstorming, exploration & play are mechanisms and dynamics that stimulate creativity. Constraints , competition , disinterest, fear & oppression, inertia, status quo & tradition, insufficient resources & time, peer pressure, poor management, stress & pressure, unreceptive & close-mindedness are the principle factors which serve to inhibit collaborative creativity.

Depth Abstract

The Depth component expands upon the conclusions drawn and developed in the Breadth component. Contemporary researchers are evaluated and compared to get insight into collaborative creativity within modern American corporate organization. This paper concludes that the dynamics that foster collaborative creativity are autonomy, freedom, control, and choice; challenge and task involvement; climate; collaboration, communication, and synergy; incentives, reward & recognition; flexibility and versatility; goals and values; leadership, empathy and motivation; sufficient resources and time. The principle thinking mechanisms that facilitate collaborative creativity are assumptions, perspectives and evaluation; brainstorming, brain-writing, and brain-sketching; exploration, experimentation and play; nominal group technique and the Delphi technique; reflective reframing; and analogical reasoning. Finally, the Depth component concludes that the dynamics that hinder collaborative creativity are constraints; competition and conflict; disinterest and dissent; fear and oppression; inertia, status quo and tradition; insufficient resources and time; peer pressure and conformity; poor management; stress and pressure; and being unreceptive and close-minded. New factors, new perspectives, and new dynamics related to collaborative creativity were gleaned from the contemporary researchers.

Application Abstract

The application component transforms the scholarly study of the dynamics of collaborative creativity within modern corporate American organizations into practice in the form of a seminar. The seminar was delivered to a live audience within Alcatel-Lucent. The seminar is evaluated, analyzed, and assessed. Improvements are also suggested for potential revision or future delivery of the presentation. The target audience of the seminar is for professionals or educators within modern American organizations. The seminar is composed of three principle sections. The first section presents the dynamics that facilitate collaborative creativity. The second section presents thinking mechanisms that can be employed by modern corporate organizations. The last major section details the dynamics that hinder collaborative creativity. Finally, the seminar slide package is appended in an appendix.

Core Knowledge Area Modules Number 3 Breadth Essay:

Theories on the dynamics of collaborative creative thinking for modern American corporate organizations

Student: Benjamin Cheung

Faculty Mentor: Dr. Teresa Bittner

Faculty Assessor: Dr. Louis Taylor

Walden University

November 17, 2007

Breadth Essay Table of contents

BREADTH ESSAY

Introduction

This paper will investigate the dynamics of collaborative creative thinking within modern American corporate organizations. The insights and theories of T. M. Amabile, D. Katz, and P. M. Senge on the matter will be analyzed, evaluated, compared, and synthesized. The breadth component will be divided into five parts; the first part is an introduction. The second part evaluates the group interaction dynamics that facilitate collaborative creative thinking. The third part explores thinking mechanisms of collaborative creative thinking. Next, the dynamics that inhibit collaborative creative thinking are investigated. Finally, a conclusion is presented.

Creative thinking and creativity. What are they? Most people probably have a sense of what creativity is. People seem to recognize creative acts when it pounces on them. The Webster's New World Dictionary of the American Language (1984) concisely defined creativity as "creative ability; artistic or intellectual inventiveness" (p. 332). Furthermore, Webster's (1984) defined creative as "having or showing imagination and artistic or intellectual inventiveness" (p. 332). Amabile, Conti, Collins, Picariello, Phillips, Ruscio, and Whitney (1996) refer to J. P. Guilford at the start of her journey to define creativity. Guilford (1967) considered creativity in terms of divergent production abilities that utilized fluency, originality, elaboration, and mental flexibility. After discussing the term at length, Amabile et al. finally concluded that a definition of creativity is comprised of two important elements. The first is that creativity "is both a novel and appropriate, useful, correct, or valuable response to the task at hand." (Amabile et al., p. 35). The second aspect is that creativity involves tasks, products, or responses are "heuristic rather than algorithmic" (Amabile et al., p. 35) in nature. Creativity shall be used in this paper to mean

intellectual inventiveness exhibiting originality, ingenuity, or imagination as applied to a problem, process, response, or concept.

Creativity involves either a person or a group of people. They bring into being an idea. They utilize some process in order to produce the idea. Finally, the idea occurs within some environment. The goal of this research is to gain some insight and develop a conceptual framework for understanding the dynamics of collaborative creative thinking. Thus the focus will be on groups of people rather than a lone creative thinker. One of the goals is to identify mechanisms that stimulate or hamper group creativity. The creative environment in question shall be modern American corporate organizations. Katz, Kahn, and Adams (1980) indicated that inventiveness and collaborative creativity plays an important part of modern American corporations through the mechanisms of patents, trademarks, and copyrights.

Group interaction dynamics that facilitate collaborative creativity

Autonomy, freedom, & choice

The freedom for a person to choose their own destiny is perhaps one of the most powerful motivators in existence. In modern American corporate organizations, this is facilitated by autonomy in professional tasks. Amabile et al. (1996) supported this conjecture by stating that "the evidence on choice about how to perform a task suggests that choice may enhance creativity" (p. 249). Amabile (1983) astutely observed that autonomy fosters a sense of control. A sense of control engenders the perception that one can steer their own destiny. This fosters creativity because it encourages exploration and expansive thinking. Amabile et al. explained that "creators have resisted external attempts to control their behavior" (p. 7). The freedom from external control also fosters intellectual freedom and exploration. This, in turn, encourages creative thinking. Amabile et al. powerfully concluded that "choice concerning how to engage in

an activity should only enhance *intrinsic motivation* and creativity" (p. 169). Amabile et al. defined intrinsic motivation as that which "arises from the individual's positive reaction to qualities of the task itself; this reaction can be experienced as interest, involvement, curiosity, satisfaction, or positive challenge" (p. 115).

Katz et al. (1980) chimed in that "performance and satisfaction are causally related" (p. 257). They observed that "contingent reward conditions, performance causes satisfaction because performance leads to rewards, which, in turn, cause satisfaction" (Katz et al, p. 263). They noted that motivation and satisfaction can be framed in terms of several dichotomies, "economic versus non-economic; intrinsic versus extrinsic; content versus context; motivation versus hygiene; satisfiers versus dissatisfiers." (Katz et al., p. 282). These dichotomies provide a set of continuums to think about motivation and satisfaction. Katz et al. stated that increased autonomy leads to increased job involvement and to improved aspirations. They noted that autonomy can come in several forms. The first is *personal level form autonomy* which is "direct decision-making influence for oneself" (Katz et al., p. 285). The second is *group level form autonomy* defined as "decision making influence for the employees as a collective." (Katz et al., p. 285). Another is *job level substance autonomy* which is "autonomy over work performance" (Katz et al., p. 285). Finally, *team/department level substance autonomy* which is "decision-making influence over the personal work situation" (Katz et al., p. 285).

Katz and Kahn (1966), unlike Senge or Amabile, sagaciously identified the basis behind autonomy. It derives from one of the nine basic aspects of systems theory, differentiation (Katz & Kahn, 1966, p. 25). An organization, seen as an open system uses differentiation and sees an "elaboration of roles" (Katz & Kahn, 1966, p. 25). This specialization allows a chance for task autonomy and choice to thrive.

Senge (1990) echoed the sentiments of Amabile et al. (1996) in what he termed *personal mastery*, that "approaching one's life as a creative work, living life from a creative as opposed to reactive viewpoint" (p. 141). He reasonably concluded that this derives from identifying the things that are most important to an individual, and having a clear picture of reality. When individuals within an organization know what they want and are allowed to develop a better understand of themselves through the needs of the organization, they are motivated to be constructive and inventive. He noted that "the ability to focus on ultimate intrinsic desires, not only on secondary goals, is a cornerstone of personal mastery" (Senge, 1990, p. 148). When people within modern corporate American organizations have a sense of freedom and ownership of their work, they will be empowered to produce creatively. Senge, Kleiner, Roberts, Roth, Ross, Smith (1999) keenly observed that managers should be "trusting people to control their own use of time" (p. 71). Senge (1990) termed this effect *localized organizations*, defined as dispersing authority and power as far from the top as possible. He concluded that "localness means unleashing people's commitment by giving them the freedom to act, to try out their own ideas and be responsible for producing results" (Senge, 1990, p. 288). Decentralizing control and empowering individuals within an organization allow groups to take on "unique new challenges, unmet and unsolved in traditional hierarchical organizations" (Senge, 1990, p. 288). Senge (1990) pointed out an interesting aspect of the traditional vertical organization. It is an "illusion that anyone could master the dynamic and detailed complexity of an organization from the top" (Senge, 1990, p. 291). Senge (1990) identified that *organic control* provides the processes necessary to balance autonomy and control. He brilliantly wrote that "the combination of mission, vision, and values creates the common identity that can connect thousands of people within a

large organization" (Senge, 1990, p. 293). Senge (1990) wisely stated that a leader should be a designer, a navigator, a steward, and a teacher.

Challenge & task involvement

What is life without challenges? People in modern corporate American organizations lament that they have too much email, too much on their plates, too many phone calls, and too many things going on. But consider, for a moment, the opposite situation. If nothing was going on, no emails, and no challenges people would have nothing to do. The assertion is that challenging tasks that involves members within the corporate organization provides new avenues of exploration, discovery, and opportunities for creative output. The autonomy and choice emphasizes that tasks are matched to the interests of the group and individual. Task involvement and challenge emphasizes that tasks are engaging, thought-provoking, meaningful, and interesting. Amabile et al. (1996) reinforced this notion by observing that "a sense of challenge arising from the intriguing nature of the problem itself" (p. 232) would encourage creative thinking. Katz et al. (1980) marched in lockstep with Amabile (1983, 1996). They stated that people desire "work that is interesting and that gives them a chance to show what they are worth" (Katz et al., p. 234).

Climate

Creativity does not happen in a vacuum. People produce creative products within some context, surrounded and influenced by environmental elements. Individuals in corporate establishments are part of a group. Groups within a modern American corporate structure are themselves part of larger organizations. Those organizations collectively form the corporate entity. Amabile et al. (1996) astutely wrote that "physical environments that are engineered to be cognitively and perceptually stimulating can enhance creativity" (p. 249). Katz et al. (1980)

echoed this sentiment by stating that an important task for leaders is to "reduce or neutralize threats to organizational stability resulting from dependence on the environment" (p. 175). Senge et al. (1999) augmented Amabile's (1996) statements by noting the importance of the physical environment to organizational productivity. One should be "sensitized to your physical environment, and how it affects the conversational music of your meetings can be as important as becoming sensitized to the conversation itself" (Senge et al., p. 192). It is often just as insightful to consider the absence of something as it is the presence of something. In contrast to Senge and Amabile (1983, 1996), Katz and Kuhn (1966) considered what would happen without a corporate climate and culture. They noted that social structures are contrived and hence imperfect and fallible. They noted that "social systems are anchored in the attitudes, perceptions, beliefs, motivations, habits, and expectations" (Katz & Kahn, 1966, p. 33). Without a proper corporate climate these social structures "come apart at the seams overnight" (Katz & Kahn, 1966, p. 33).

Collaboration, communication, & synergy

Friends, family, co-workers, managers, salesmen, clerks, business partners, rivals, and service support people. People in modern American corporate organizations are surrounded by a network of people. Some people are there to provide support, other are there to collaborate. People share ideas through communications, they bounce ideas off of each other, and people can assist others in generating ideas. People can encourage each other to have ideas. The spark of something new from one individual in a group can be brought to the full roar of a new idea through the interaction with other people in the group.

Amabile (1983) noted that one of the most powerful factors in stoking the flames of creativity comes through collaboration. Amabile et al. (1996) wrote that "a corporate climate

marked cooperation and collaboration across levels and divisions" (p. 231) will stimulate creative thinking. It may seem obvious in hindsight that communication, collaboration, and synergy within and without the group are vital to success and creative thinking. Senge (1990) chimed in that "team learning starts with dialogue the capacity of members of a team to suspend assumptions and enter into a genuine thinking together" (p. 10). He described the etymological origins of the word dialog, evolving from the Greek word dialogos meaning a free-flow of meaning through a group. This "allows for a group to discover insights not attainable individually" (Senge, 1990, p. 10). In order to work through problems and consequently think creatively in collaboration groups must work together. This might seem obvious. Senge (1990) convincingly pointed out that important issues require different groups, departments, and functional areas to cooperate "regardless of parochial organizational boundaries" (p. 66). He termed this the "principle of the system boundary" (Senge, 1990, p. 66).

An important aspect of collaboration and synergy is team communication. When a team learns how to exchange ideas effectively through language, a powerful synergy can be achieved. Effective communication can foster the development of an idea since team members can build upon the seed of an idea. Katz and Kuhn (1966) observed that communication can be used to exchange information, "transmit meaning" (p. 223), reveal problems, resolve problems, clarifying problems, "task coordination" (p. 244), elaborate perspectives, provide feedback, give "task directives" (p. 239), indoctrinate, vent frustrations (p. 247), explaining practices, furnishing "socio-emotional support" (p. 244), and refine ideas. The seed of an idea is planted in the mind of other people through effective expression, description, and explanation. Once planted, the seed can germinate, mature, and sprout. Senge (1990) refined this notion when he explained that "there are two primary types of discourse, dialogue and discussion" (p. 240). Discussion

suggestions a contest where viewpoints clash and there is a champion that prevails. Senge (1990) carefully explained that the word dialogue derives from the Greek word *dialogos*, where *dia* means through and *logos* means word, or meaning. He nurtured the notion that dialogue can transcend the viewpoint of one individual because the "group explores complex difficult issues from many points of view" (Senge, 1990, p. 241). He insightfully wrote that "the whole organizes the parts, rather than trying to pull the parts into a whole." (Senge, 1990, p. 241). Senge (1990) powerfully observed that "in dialogue people become observers of their own thinking" (p. 242). Under these circumstances, collaborative, original, inventive, creative thinking is clearly enhanced through good team communication. Finally, Senge (1990) noted that communication is fostered best when dialogue is balanced with discussion, assumptions are suspended, and "when participants regard each other as colleagues" (p. 243).

Senge et al. (1999) took a cue from Amabile et al. (1996) and promoted the idea that collaboration is important. They noted that people have six intelligences including "fiscal intelligence" (p. 548), "social intelligence" (p. 549), "*noetic intelligence*" (p. 549), "emotional intelligence" (p. 550), "environmental intelligence" (p. 550), and "spiritual intelligence" (p. 551). Noetic intelligence is defined as the "capability for thinking and learning, particularly in groups and thus continuously raising the collective IQ" (Senge et al., p. 549). The notion of noetic intelligence supports the idea that synergy plays an important role in collaborative creative thinking.

Katz et al. (1980) propped up the third leg of the conceptual tripod by indicating that communication plays an important part of organizational effectiveness. They defined two types of organizational inputs, *energic* which is human labor and physical forms of energy. Katz et al. defined the second type as informational. Communication deals with information exchange,

coordination of tasks, "direction of information flow" (p. 299), "distortion of information" (p. 299), and "communication networks" (p. 299). They noted a number of factors which can influence communication including organizational complexity, centralization, formalization, "organizational width" (p. 300), "boundary spanning liaisons" (p. 300), trust, "extensity, redundant, and feedback loops" (p. 301) of communication networks. Communication plays a key role in the exchange of ideas, and supporting collaboration. Katz et al. noted that organizational complexity affects "the degree of personal specialization" (p. 302), centralization affects the "distribution of power" (p. 302), and formalization affects the rules that are followed. Finally, they noted that organizational size, shape and technology affect communications. Katz et al. insightfully asserted that "an increase in organizational size decreased vertical communication but left lateral communication unaffected" (p. 319). They observed that organizational structural complexity hinders communication. The "more decentralized the organization, the greater the frequency of" (Katz et al., p. 320) communication. Hierarchy "restricts the free flow of information" (Katz et al., p. 328). Similarly centralization can distort, block, and interfere with communication. Katz and Kahn (1966) also highlighted another important aspect of communication, that of information coding. They defined this to be the process of filtering, translating, selecting, simplifying, and differentiating information.

Encouragement, reward & recognition

If the body starves from lack of food, the mind withers from lack of encouragement. Acknowledgement that a person is engaged in a meaningful activity generates hope, which fosters creativity. There are probably few if any more powerful elements in the human psyche than hope and creativity. Amabile (1983) highlighted a subtle aspect of rewards. She astutely noted that rewards can be used to affect a higher enjoyment of an activity. Because intrinsic

motivation is increased as a result, creative thinking is augmented. Amabile et al. (1996) penned that research has "demonstrated that a clear enhancement of creativity when subjects were offered" (p. 249) a relevant reward. Katz et al. (1980) further promoted this notion by noting that "pay, promotion, opportunities, supervisory praise" (p. 217) as mechanisms of reward within organizations can positively influence the performance, attitudes, and perceptions of individuals. Katz et al. observed that these factors influence attitude, "intrinsic satisfaction" (p. 226), "organization involvement" (p. 226), "intrinsic motivation" (p. 226), and the reduction of "voluntary turnover" (p. 226). They observed that "punishment and reward have been the twin tools of motivational theory and of practice for centuries" (Katz et al., p. 234). Rewarding desired responses will positively reinforce behaviors causing them to persist. "Reward given for engaging in an activity can affect the orientation toward that activity" (Katz et al., p. 265). In contrast to Katz et al. (1980), Senge et al. (1999) offered practical advice. They noted the importance of delivering feedback that is "honest, candid, compelling, and helpful" (p. 110). Senge et al. (1999) trumpeted that encouragement promoted excellence, accountability, and personal development.

Flexibility & versatility

Flexibility and versatility are important not just to an individual but also to modern corporate American organizations. The world is a rapidly changing place, and it requires individuals and organizations to be flexible and adaptive. Flexibility encourages teams and individuals to consider new options which stimulate original thinking.

Amabile (1983) noted that in various studies, flexibility is a cherished aspect of creative thinking. Senge (1990) took this basic idea and went further than Amabile. Not just flexibility, but a shift in thinking is required to achieve a new level of awareness. He resurrected the term

metanoia (Senge, 1990, p. 13) which derives from the Greek word meaning a fundamental shift or change. Senge (1990) pointed out that the Greek word *meta* means beyond and the *noia* comes from the root nous, meaning the mind. Paranoia is another English word that employs the Greek word root base noia. Hence, metanoia implies a transcendence of mind. Senge (1990) disclosed that "leverage often comes from new ways of thinking" (p. 40). Katz et al. (1980) noted that modern organizations must be flexible and willing to adapt to their "external environments" (p. 59) in order to survive. Katz et al. stated that "*environmental dynamism*" (p. 61), "perceptions of environmental complexity" (p. 61), and "uncertainty about the environment" (p. 61) are the primary motivators for change, adaptation, and need for flexibility within the modern organization. Flexibility can also mean seeing the world from a different perspective, having the mental agility and the open-mindedness to see the world in a different light can promote creative thinking. Senge et al. (1999) introduced the notion of five kinds of systems perspectives including system dynamics, open systems, social systems, process systems, and living systems. Senge et al. (1999) outlined that open systems is akin to "seeing the world through flows and constraints" (p. 138); social systems is "seeing the world through human interaction" (p. 140), process systems as "seeing the world through information flow" (p. 142); living systems as engaging the world "through the interaction of dynamic entities" (p. 144).

Katz and Kuhn (1966) swung the spotlight of reason onto a difference face of the issue of flexibility. They observed that organizations are continually in flux. Flexibility can be used to generate new ideas, but creativity can also be used to help an organization adapt to its environment. Katz and Kahn (1966) astutely trumpeted that there are two primary sources of organizational change, one resulting from "changed inputs from the environment" (p. 446), and the other from "internal system strain or imbalance" (p. 446).

Goals & Values

The power of goals is generally recognized to be a powerful internal motivator to success. If you know what you are trying to achieve, and where you would like to go you have the ability to measure against those goals, and a basis for evaluating ideas. Goals can give you a direction and a sense of where a group needs to head in order to accomplish an objective successfully. You have a sense of up and down, progress and regression. Amabile (1983) supported this assertion. Amabile et al. (1996) also supported this conjecture with "intrinsic motivation is conductive to creativity" (p. 15).

Along the same lines, Senge (1990) insightfully wrote that inspired organizations have "the capacity to hold a shared picture of the future we seek to create" (p. 9). In fact, Senge (1990) boldly proclaimed that organizations are unable to attain true greatness without "goals, values, and missions that become deeply shared throughout the organization" (p. 9). A shared vision and goals within a group can serve as a rallying point, and lend cohesiveness throughout the organization. Senge (1990) noted that *generative learning* "will seem abstract and meaningless until people become excited about some vision they truly want to accomplish" (p. 206). He defined generative learning as opposed to *adaptive learning* as the ability to create. In other words, collaborative creative thinking or original inventiveness. When individuals within any organization have a deep vested interest in something all manner of ingenuity, creativity, and inventiveness will crawl out of the woodwork. Senge (1990) reinforced this notion by adroitly writing that collaborative creativity "occurs only when people are striving to accomplish something that matters deeply to them" (p. 206). Senge (1990) further reinforced this notion by continuing that *intrinsic goals* "call forth the creativity and excitement of building something new" (p. 207). An intrinsic goal is a goal that is focused on something relative to an "inner

standard of excellence" (Senge, 1990, p. 207). Goals have the power to provide energy to individuals in an organization, motivating them to think in new ways. This, in turn, fosters collaborative creativity. Senge et al. (1999) stated it is important to articulate the purpose of the organization in order to generate a shared vision.

In a radical departure from Amabile et al. (1996), Senge (1990) proposed that *process thinking* versus *snapshot thinking* (p. 65) plays a vital role in the ability to an organization to think cohesively. Basically, Senge (1990) defined process thinking as the ability to see the big picture. Process thinking Senge (1990) pointed out requires leaders within an organization to "think consciously of change over time" (p. 65). When systems are considered in the context of spanning time, greater perspective can be attained. This, in turn, facilitates inventive thinking because new opportunities and solutions present themselves when a better understanding of the system is achieved. He stated "to understand the most challenging managerial issues requires seeing the whole system that generates the issues" (Senge, 1990, p. 66). Senge (1990) noted that "systems thinking is a disciplines for seeing wholes" (p. 68). Clearly, systems thinking is important when it comes to setting goals. For it allows leaders within an organization to set marching order from the mountaintop vantage point of perspective. Senge (1990) cleverly noted that this greater perspective is "the art of seeing the forest and the trees" (p. 127). In contrast to Amabile and Senge, Katz and Kahn (1966) warned that the goals of individuals might not align with the organization. However, they also noted that "the values centering about the objectives of the system furnish another source of integration" (Katz & Kahn, 1966, p. 38). Katz and Kahn (1966) noted that roles, norms, and values are the three things that serve to bring cohesion to organizations. They identified transcendental, moral, sacred values, and pragmatic values (Katz & Kahn, 1966, p. 54) and the principle types of organizational values. Katz & Kahn (1966)

documented that "the internalization of organizational goals is at once the most effective of motive patterns" (p. 389). Internalization of goals results in "high productivity, and maximal spontaneity and innovativeness in the service of those goals" (Katz & Kahn, 1966, p. 389).

Management support & motivation

In any large enterprise such as the typical modern American corporate organization, a structure of management exists. Leadership provides a vision, direction and establishes a structure of organization. There are many kinds of managerial philosophies. Some enforce a tight control over individuals others give them free reign. Management can encourage or discourage projects and new ideas. Management also provides political support, morale support, and resource support. Managers can influence important social factors that Amabile et al. (1996) specified, such as work stability and the degree to which employees have the "responsibility for initiating new activities" (p. 211). Senge (1990), like Amabile (1996), also acknowledged the importance of managerial support throughout his works. One of the most foundational aspects of this support, Senge (1990) ascertained, is the understanding of *mental models*. A mental model is an accurate world view which reflects reality that is not riveted with assumptions and delusions. Senge (1990) judged that the best mental models reflect reality, identify critical feedback relationship, accurately estimate process delays, and focus on "high leverage" (p. 203), key variables. He reasoned that the integration of systems thinking and mental models will be the key. He wrote "shifting from mental models dominated by events to mental models that recognize longer-term patterns of change and the underlying structures producing those patterns" (Senge, 1990, p. 204) will allow organizations to be productive, successful, and inventive. Senge (1990) insightfully observed that there are varying levels of support for goals which he identified as apathy, noncompliance, genuine compliance, enrollment, and commitment (p. 219). It seems

obvious that if the individual goals can be aligned with the goals of the organization the most powerful creative forces can be unleashed. Senge (1990) supported this notion by noting that "alignment is the necessary condition before empowering the individual will empower the whole team" (p. 235). He confirmed that it is best when "the shared vision becomes an extension of their personal visions" (Senge, 1990, p. 235). Senge (1990) hypothesized that alignment occurs when people think insightfully, coordinate innovation, and share insights with other teams. Senge et al. (1999) suggested that good management builds credibility through articulation, develops awareness, provides clarity of purpose, sets a context for work, listen, encourage collaboration, and insure availability of resources.

Katz et al (1980) jumped on the bandwagon and pointed a beacon at the relationship between management systems, operations and organizational performance. Katz et al. indicated that there are two basic types of management systems, one is a *mechanistic management system* and the other is an *organic management system*. Mechanistic management systems are defined as those that emphasize "a highly structured organization with a hierarchy of authority, specialized differentiation of functional tasks, and rules and regulations which specified roles and relationships "(Katz et al., p. 114). An Organic management system is based on "a less formal organization with lateral rather than vertical relations, participation of lower members in decision making, and greater flexibility of roles and relationships" (Katz et al., p. 114). It seems reasonable that a mechanistic or organic management system should influence collaborative creativity. Indeed, Katz et al. demonstrated a relationship between management type and performance. Katz et al. pointed to a number of influencers that management has at its disposal. These include arousing needs, "increasing payoffs" (p. 360), coaching, clarifying expectations, "reducing frustrating barriers" (p. 360), increasing opportunities, improving consideration,

rewarding actions, being fair, sharing information, conflict management, "setting goals, designing feedback systems, placing personnel, designing job systems, and designing reward systems" (p. 361). Katz et al. developed the idea that there are many important characteristics that a manager sports including values, beliefs, motivation, interpersonal competence, history, openness, and managerial style. Furthermore, Katz and Kuhn (1966) drew a line in the sand differentiating the concept between influence, leadership, and management. They identified two types of leadership "*socio-emotional leadership* supportive of group maintenance and *task leadership* oriented toward getting the work done" (Katz & Kuhn, 1966, p. 33). They acknowledged the importance of reward systems, "people's experiences in the system must be rewarding, particularly if they have freedom to move in and out of organizations" (Katz & Kahn, 1966, p. 41).

Sufficient resources & time

Adequate resources and sufficient time serves as an oil to grease the creative engine of collaborations. A mighty oak tree of an idea can blossom from a small acorn if the proper care, time, support, attention, and resources are available otherwise the idea withers away. This seems to make a measure of common sense. Indeed, Amabile (1983) also noted that sufficient resources are vital to the creative process. Katz et al. (1980) observed that an "increase in funds allocated to research and development" (p. 188) can play an important part in the creative production of the organization. Senge et al. (1999) viewed the problem from a different angle than Katz or Amabile. They suggested that encouraging efficient time management, "valuing unstructured time" (p.71), reducing nonessential activities, retiring political brinksmanship, combine initiatives, and "scheduling time for focus and concentration" (p. 71) could help make time for important activities.

Thinking mechanisms that facilitate collaborative creativity

Brainstorming

Brainstorming is a famous technique for collaborative creativity. Amabile et al. (1996) pinpointed the fact that Brainstorming was first proposed by Alex Osborn in 1938. Brainstorming involves a period of idea generation and idea evaluation. Group members participate during the idea generation phase to produce ideas. During the idea generation phase the group should not judge ideas, and encourage a quantity of ideas over the quality of ideas. Amabile et al. noted that "combination and improvement are sought" (p. 244). After ideas are generated by the group, they are then evaluated. Amabile et al. also mentioned that brainstorming can be improved if the participants first considered the problem individually, and if the individuals take turns providing ideas during a session.

Exploration & play

One of the basic mechanisms to stimulate creativity is allowing your mind to run free. When you unleash the mind and allow it to roam free on the open ranges of opportunity, anything is possible. Amabile et al. (1996) asserted that play is an important component creative behavior and, moreover, that "prior playful activity can lead to playfulness and creativity during task engagement" (p. 225). Amabile et al. concluded that play facilitates originality and creativity because it allows people to discover new uses for objects and engage the imagination. It seems reasonable to suggest that exploration encourages the mind to explore many options, considering many alternatives, and fostering alternative solutions. Exploration also entails the discovery of things that would have not otherwise been noticed without a purposeful attempt to seek new aspects of the circumstances surrounding the problem.

Senge (1990) proposed a slightly different view of exploration than Amabile et al. (1996). However, his view is equally valid and interesting. Furthermore, it bolsters the assertion that allowing individuals to explore is an important aspect of dynamics within organizations. He identified this phenomenon as one of the aspects of the laws of the fifth discipline. He entitled the effect the easy way out usually leads back in (Senge, 1990, p. 60). By this he meant that organizations, groups, and individuals must transcend their comfort zone if they are to be creatively productive. He continued that "we all find comfort applying familiar solutions to problems, sticking to what we know best" (Senge, 1990, p. 61). However, in order to be inventive it is necessary to do the unfamiliar, and to explore. Furthermore, Senge (1990) astutely noted that "small changes can produce big results, but the areas of highest leverage are often the least obvious" (p. 63). Thus, in order to discover these unobvious elements of high leverage which are capable of bringing about great change, individuals within an organization must explore, experiment, play, and search. Senge (1990) also observed that a "shared vision fosters risk taking and experimentation" (p. 209). Having a shared vision within an organization supports the collaborative exploration necessary to break out of the status quo and into something new. New unexplored regions of mental space are where original inventiveness lies.

Play should not be just for the sake of wasting time, but rather the team should collaborate to design, build, and trial experiments that will demonstrate the feasibility of a proposed idea. Furthermore, the team can try out new ideas and extend proposals through the use of experimentation and play. Senge (1990) corroborated this assertion by writing that "significant innovation cannot be achieved by talking about new ideas; you must build and test prototypes" (p. 271). Prototypes allow teams to see what fails; see what works, and spark new ideas for new directions of exploration. Senge (1990) also emphasized that "the prototyping era

for any significant new innovation is a time of searching for synergy, for pulling together diverse elements into a new whole" (p. 271). It gives the group an opportunity to rally behind a proposal and becomes a time where the experimentation leads to meaningful developments that result in original inventiveness. Senge et al. (1999) stated the importance of reflection, exploration and learning to ask good questions.

Furthermore, modern technology such as advanced computer programs can create what Senge (1990) termed *microworlds* which are simulated artificial environments. Microworlds are filled with *transitional objects*, which are the objects that inhabit a microworld. Senge (1990) noted that computers "are making it possible to integrate learning about complex team interactions with learning about complex business interactions" (p. 315). Senge (1990) perceptively noted that these microworlds can be used to develop strategies, find opportunities, and "discover untapped leverage" (p. 316).

Obstacles to collaborative creative thinking

Not all things in the world are positive. Not all group dynamics are beneficial to the group. Some mechanisms are present obstacles to collaboration. These pitfalls serve to inhibit creative thinking in groups within modern corporate American organizations. The following factors have been identified as detrimental factors to healthy interaction when it comes to cooperative group creative thinking. A thorough analysis of the dynamics of collaborative creative thinking should include the factors that serve to bolster creativity as well as the factors that detract from creativity. Senge (1990) expertly reported that "many of the best ideas never get put into practice. Brilliant strategies fail to get translated into action. Systemic insights never find their way into operating policies" (p. 174).

Constraints

Constrains come in all manner of shapes and sizes. Groups are constrained by resources, time, politics, inertia, process, policy, problems, associations, and social dynamics. Some of these factors will be discussed as topics in their own right. In a sense constraints over work and confining dimensions of a problem are the opposite of autonomy, one of the dynamics identified as a dynamic that facilitates creative thinking. Amabile (1983) proposed that freedom from constraints encourages group creativity. Amabile et al. (1996) insightfully wrote that collaborative creative thinking within groups "correlates positively with the degree to which the members of those work groups report feeling that they have freedom in their work, a sense of autonomy and control over their own work and their own ideas" (p. 177). The assertion that constraints hinder collaborative creative thinking is based on the simple premise that creativity thrives on expansive thinking and exploration.

Senge (1990) marched off in a completely different direction than Amabile (1983) and Amabile et al. (1996) when it came to the issue of constraints. Constraints can also be seen as a restriction that arises from misunderstanding, ignorance, or complexity of a situation. Individuals place constraints on themselves because they think that something isn't possible. The four minute mile, breaking the sound barrier, and initial attempts at breeching heavier than air powered flight are some obvious examples. Senge (1990) defined two types of complexity. The first he termed *detail complexity* and the second was labeled *dynamic complexity* (Senge, 1990, p. 71). Detail complexity involves a situation with numerous variables. Dynamic complexity entails situations "where cause and effect are subtle and where the effects over time of interventions are not obvious" (p. 71). Senge (1990) lamented that hacking away with conventional planning and analysis methods are ineffective in the battle against dynamic complexity. The path to victory

lies in understanding dynamic complexity, "seeing interrelationships rather than linear cause and effect chains" (Senge, 1990, p. 73), and isolating important structures and processes. Senge (1990) astutely noted that this involves "reinforcing and balancing feedback delays" (p. 79), isolating "sources of stability and resistance" (p. 84), understanding *reinforcing processes* (p. 81), and "delays between action and consequence" (p. 89). Senge (1990) brilliantly jotted that "the bottom line of systems thinking is leverage, seeing where actions and changes in structures can lead to significant, enduring improvements" (p. 114).

For every idea there is an equal and opposite idea. Katz, et al. (1980) pointed to the opposite of autonomy and freedom that result from modern corporate information technology. Where Senge (1990) warned of the illusion of centralized control, Katz et al. noted that modern technology allows individuals to be controlled. Working within corporate American organizations places new constraints resulting from modern computerized technology which allows for monitoring and displacement of individuals.

Competition

Competition is a double edged sword in the modern American economy. It serves to bring better products and ideas to the consumer. On the other hand, competition can also bring out the worst in people and companies. Individuals within modern corporate American organizations can be pitted against each other, and serve as a social poison eating away at the cohesion of the group. Amabile (1983) highlighted some interesting aspects of competition as it relates to creativity. Amabile et al. (1996) penned that competition deals with "evaluation, reward, and an additional win—lose aspect that is unique to competitive situations" (p. 239). Competition can create uncomfortable work conditions for individuals within an organization. Amabile et al. concluded that "competition has a negative effect on creativity" (p. 239).

Katz et al. (1980) took a slightly different approach than Amabile (1983) and Amabile et al. (1996) on the topic. Competition can come in the form of conflict. Katz et al. identified that there are four types of conflict, *person-role conflict, intersender conflict, intrasender conflict,* and *overload.* In general, they define conflict as "the direct interactive behavior of two or more parties such that the actions of one tend to prevent or compel some outcome against the resistance of the other" (Katz et al., p. 465). They defined a person-role conflict "as the degree of incongruity of incompatibility of expectations associated with a role" (Katz et al., p. 139). They calculated that intersender conflict occurs from expectation differences between senders, intrasender conflict arises from incompatible orders, and overload from a lack of resources needed to accomplish a task. They noted that these sources of conflict affect "tension, satisfaction, interpersonal relations, and effectiveness on the job" (Katz et al., p. 147). Often collaborative creative thinking results in change within the organization. However, Katz et al. wisely observed that "the resistance of organizations to change can be wise or foolish, constructive or destructive, peaceful or violent" (p. 465). An organization is composed of distinct yet interdependent parts "each has distinctive interests and perceptions, and therefore distinctive preferred states" (Katz et al., p. 466). They brilliantly observed that "an organization exists and functions as a whole, and thus expresses a kind of consensual agreement, but it is an agreement born of compromise, bargaining, and the exercise of power" (p. 466). Finally, Katz et al. pointed to a number of mechanisms to deal with conflict and competition including "withdrawing, smoothing, compromising" (p. 472), "forcing, compromise, confrontation" (p. 466), "mediation, voluntary arbitration, compulsory arbitration" (p. 466), and "interpersonal process consultation" (p. 467). Also, Katz and Kuhn (1966) termed the dynamic tension of competing subgroups within an organizational all striving for survival, *the maximization principle* (p. 99).

Disinterest

Apathy. Disinterest is a cancer that eats away at the mind. It slowly grows and metastasizes into a blanket of despair. Motivation comes from within an individual; it wells up from within. It seems obvious that disinterest would hamper creative thinking. If people are not interested in what they are doing, they will barely be able to accomplish their assigned tasks, let alone come up with original and inventive ideas. The concept of disinterest inhibiting collaborative creativity is the opposite of what Amabile (1983) termed *intrinsic motivation*. People who are disinterested will not expend the time and effort necessary to search for creative solutions. Amabile et al. (1996) also echoed this sentiment by stating that "a lack of organizational support, interest, or faith in a project; a perceived apathy toward any accomplishment coming from the project" (p. 232) is a major obstacle to creativity. Senge (1990) scaled the walls of this topic from a different parapet. He used the term *trance of mediocrity* (Senge, 1990, p. 333) to describe a situation where people and customers try hard at first to make a difference. When they are discouraged by their efforts to fight the system, they eventually become apathetic.

Fear & oppression

Fear and oppression are the dark side of the social force. Managerial structures or organizational systems that serve to suppress the human spirit will hold back creativity. Creativity requires that the human spirit of creativity be unleashed and unfettered. If individuals within a group are fearful of putting forth ideas because they will be ridiculed, or not received positively, they will in time learn to stop putting forth new ideas. Oppressive groups where managers choke the life out of the spirit of individuals will not be very likely to produce inventive and original ideas.

Senge (1990) wistfully indicated that blame is a fundamental disability that is exhibited by organizations. He coined the phrase *the enemy is out there syndrome* to label this condition. When organizations and individuals within modern corporate American organizations erect boundaries between groups, shift blame, and shirk accountability they evoke fear, paranoia, and distrust. These negative qualities, in turn, grow like a malignant cancer detracting from positive and productive creative efforts. Senge (1990) noted that other symptoms include false appearances, protecting turf, keeping up an image, and group break-down under pressure. Furthermore, Senge (1990) indicated that blame is the quick way out, "more often than we realize, systems cause their own crises, not external forces of individuals' mistakes" (p. 40).

Another subtle aspect of this problem is that problems tend to creep from one place to another. Senge (1990) wisely noted that today's problems come from yesterday's solutions. He stated that this was one of the laws of the fifth discipline that plague corporate organizations. As one problem causes a domino chain of problems to fall it spreads fear and confusion throughout the ranks. This disrupts reasonable thinking.

In a similar fashion, Katz et al. (1980) reinforced these notions by describing how punishment and penalties evolves into a "model of power and authority. Control rather than punishment becomes the central concept." (p. 234). This creates an environment of fear and oppression. Poorly managed centralized control disrupts creativity and performance. "The transmission of control is a central problem in the study of hierarchical organizations because the opportunities for miscommunication and distortion are so rich." (Katz et al., p. 240).

Inertia, status quo & tradition

Unwillingness to accept new ideas because of the power of history, the inertia of the status quo will serve to choke the life out of new inventive ideas. New concepts, new ideas,

original thinking requires change. People, groups, or organizations with a vested interest in the existing process, system, product, service, concept, or idea will most likely resist new ideas. People become accustomed to doing something in a particular way. They settle into old habits. They gain allegiance to particular ideas or concepts. This sclerosis of the mind serves to hamper creative thinking. Amabile (1983) asserted that fear of risk taking hinders creativity. Amabile et al. (1996) hammered home the notion by writing that "reluctance of managers or coworkers to change their way of doing things; an unwillingness to take risks" (p. 232) impedes collaborative creative thinking. They brought up an important aspect of creativity, that of risk taking. Often new ideas require some amount of risk. New ideas require stepping into the unknown, they often bring change. Change often requires risking the traditional way of thinking or doing things.

Senge (1990), unlike Amabile (1983) and Amabile et al. (1996) took a slightly different route to explore this thorny issue. He astutely observed that "we learn best from experience but we never directly experience the consequences of many of our most important decisions" (Senge, 1990, p 23). Because people are not able to consider long term consequences, they remain mired in short term issues, which have the effect of propagating the status quo. Senge (1990) insightfully observed that "people do not focus on the long term because they have to, but because they want to" (p. 210). The oppressive power of tradition, the status quo, and habit can steamroll over new fledgling ideas. There are a number of things which might serve to counteract the status quo. Senge (1990) identified a shared vision which stimulates internal motivation as one of those factors. He wrote without "a pull toward some goal which people truly want to achieve, the forces in support of the status quo can be overwhelming" (Senge, 1990, p. 209).

Furthermore, Senge (1990) persuasively established that ideas fail "because they conflict with deeply held internal images of how the world works, images that limit us to familiar ways

of thinking and acting" (p. 174). Senge (1990) offered a solution to combat the inertia of familiar habits. He described his method as the management of *mental models* (Senge, 1990, p. 174). Senge (1990) noted that this entails "surfacing, testing, and improving our internal pictures of how the world works, promises" (p. 174). In other words, when groups have a better understand of their reality, when they are armed with the proper information, they can march off to the front lines and do battle with the oppressive forces of inertia, habit, and tradition. Finally, Senge (1990) concluded that this often results in "incubating a new business worldview" (p. 178).

Insufficient resources & time

New ideas take resources in order to see the light of day. Time, human resources, and support are the midwives of a new idea. Insufficient resources can serve to starve a new idea. This might seem to be nothing more than common sense. Inventiveness requires time, resources, and man power in order to gain a foothold into world. Amabile et al. (1996) acknowledged that insufficient resources is an environmental obstacle to creativity noting that this can arise from "a lack of appropriate facilities, equipment, materials, funds, or people" (p. 232).

Amabile et al. (1996) wisely identified that "insufficient time to think creatively about the problem; too great a workload within a realistic time frame; high frequency of fire fighting" (p. 232) is also an impediment to creativity. Senge (1990) further supported the notion that insufficient time constrains collaborative creative thinking. He noted that individuals within modern organizations often have insufficient time to think and reflect upon problems. Senge (1990) noted that it is important to carve out time to "work in continuous cycles of pausing to develop hypotheses, acting, and pausing to reflect on the results" (p. 303).

Furthermore, insufficient time can come from poor management of time. Spending time on unimportant activities steals from the time spent on important activities. Creativity requires

time for reflection and can be easily starved by mismanaged time. Senge (1990) supported this notion by writing that managers within organizations might erroneously spend too much time on *convergent problems*, which are problems "that should be dealt with more locally in the organization, or they have given insufficient time to complex problems" (p. 304). Senge (1990) sagaciously discerned the difference between action and activity. He wrote "action will still be critical, but incisive action will not be confused with incessant activity" (Senge, 1990, p. 304).

By contrast to Amabile and Senge, Katz et al. (1980) produced a reasonable rationale for limited resources. They stated that "all social systems face the important task of allocating scarce resources" (Katz et al., p. 397). While this doesn't change the fact that a scarcity of time and resources will serve to constrict, limit and discourage collaborative creativity, it explains it reasonably. Another important aspect of this issue is that the allocation of resources might not be based on rational factors, organizational politics or personal agendas might come into play as well. Katz and Kahn (1966) stated that lack of time and information overload leads to errors, delays, miscommunication, cutting corners, and "escaping the task" (p. 231).

Peer Pressure

Individuals are influenced by their peers. Collaboration and synergy was identified as a dynamic that facilitates collaborative creative thinking. Peer pressure can be a powerful social mechanism to cause individuals not to stray from the pack. Amabile et al. (1996) recognized this impediment to creativity by writing "conformity pressure from peers can lead to at least temporary decrements in creativity" (p. 251). Amabile (1983) corroborated this assertion. This dynamic is related inertia, status quo and tradition. Peers within an organization can serve to perpetuate a viewpoint; they can stifle new thinking by pressuring other individuals to conform to existing viewpoints. Peer pressure can hamper creative thinking in groups within modern

American corporate organizations because individuals who stray from the conventions of the group become social outcasts. Peer pressure is like a powerful vacuum cleaner of the mind that pulls in stray thinking and snaps it into alignment with the rest of the group. As such it becomes an impediment to original creative thinking. Katz and Kuhn (1966) identified that "the behavior of associates does exert tremendous power over the individual" (p. 395). Peers can straight-jacket thinking by exerting social pressure to conform.

Poor Management

Poor management within modern corporate American organizations can serve to decapitate new ideas. There are many ways that poor management can serve to stifle the organization. Personality conflicts can create tension in the group. Managers who are not receptive to new ideas will not back up new ideas and provide the proper support necessary for inventiveness to thrive. Political turmoil is fueled by poor management. Poor management can serve to obfuscate clear objectives that are necessary for creative thinking to thrive. A lack of leadership can cause confusion due to a sense of misdirection. Amabile et al. (1996) panned that "a manager who is unable to set clear direction, who has poor technical or communication skills, who controls too tightly, or who allows distractions and fragmentation of the team's efforts" (p.. 232) will become an obstacle to creativity.

Senge (1990) made a shrewd observation that was missed by the other theorists. The effect he described is termed *the tragedy of the commons*, which describes a "situation where what's right for each part is wrong for the whole, where an apparently logical local decision making can become completely illogical for the larger system." (Senge, 1990, p. 294). This sort of situation can occur in many circumstances. For example consider a generic company where each group vies for corporate funding. Each group desires to propagate its ideas and expand its

assigned endeavors. However, it might necessary for some groups to be disbanded and transferred onto a fledgling new idea. In this case the commons is the corporate funding. Senge (1990) identified that this effect occurs when "individual decision makers, free to dictate their own actions, achieve short-term gains from exploiting the resource but do not pay, and are often unaware of, the cost of that exploitation" (p. 295). This is where the punch line is delivered. Senge (1990) claimed that to solve the tragedy of the commons, proper identification and management of the commons must be put in place.

Stress & pressure

Stress and pressure are elements within the environment that can hamper productive work. Stress and pressure can create hostility and shorten tempers. Stress and pressure can create tension within a group and cause social responses between individuals to break down. When too much stress and pressure are prevalent within an organization new ideas are overshadowed by the panic and distraction of emergencies and fire fighting. Amabile (1983) indicated that stress hampers creative efforts. Amabile et al. (1996) clearly pointed out that "the fewer extraneous difficulties people must cope with in their work, the more likely they are to perform creatively" (p. 254). Stressors that originate from outside of the group can also hamper creative producing within modern corporate organizations. Amabile et al. echoed this sentiment by stating that "stress and pressure that are unrelated to the project itself will most likely undermine creative performance" (p. 254).

Katz et al. (1980) made an important difference between effectiveness and efficiency. They defined efficiency as the "use of inputs to obtain a maximum return, whereas effectiveness refers to the exploitation of the environment" (Katz et al., p. 172). These impact performance measures such as "growth and decline, survival, adaptability, productivity, turnover, absenteeism,

member satisfaction, and client satisfaction" (Katz et al., p. 172). They promoted that effectiveness if best achieved through by being adaptable. Katz et al. noted that stress can come from a variety of sources including "conflict" (p. 420), "ambiguity" (p. 420), "role conflict" (p. 421), "overload" (p. 425), "inadequate resources" (p. 426). and "job dissatisfaction, depression, physiological strain" (p. 444). Katz and Kuhn (1966) described overload occurs when a "focal person, however, finds that he cannot complete all of the tasks" (p. 184) that they need to producing a dilemma of priorities.

Unreceptive & close-minded

A good idea needs resources, nurturing, caring and an open mind. The beginning is a fragile time, when an idea is newly hatched. When individuals are unreceptive and close minded to new ideas, it is hard for inventiveness to gain a foothold. The most powerful seed of an idea will not flourish into the flower of a developed idea without hope, optimism, and an open mind. For change to occur an organization must be will to change. Amabile et al. (1996) noted that "an organizational culture that impedes creativity through internal political problems, harsh criticism of new ideas, destructive internal competition, an avoidance of risk" (p. 233) are obstacles to creative production. Amabile (1983) attested to this assertion.

Senge (1990) tackled the issue from a different angle than Amabile et al. (1996). Senge (1990) discussed openness as an important group dynamic. He identified two types of openness, *participative* and *reflective* (p. 277). Senge (1990) defined participative openness as "the freedom to speak one's mind" (p. 277). If individuals within a corporate organization are unwilling, or not comfortable with speaking their mind their ideas will never surface. This then clearly represents a hindrance to collaborative creative thinking. Senge (1990) adroitly defined reflective openness as "the willingness to challenge our own thinking, to recognize that any

certainty we ever have is, at best, a hypothesis about the world" (p. 277). He concluded that this attitude fosters the testing and improvement of ideas. Clearly an organization that fosters both participative and reflective openness will gain the benefits of expression and revision during the generative stages of collaborative creative thinking.

Conclusion

There are many dynamics that serve to facilitate creativity and numerous factors that impede creative thinking within modern American organizations. Autonomy, freedom, control, & choice, challenge & task involvement, climate, collaboration & synergy, encouragement, reward & recognition, flexibility & versatility, goals, management support & motivation, peer pressure, sufficient resources & time, brainstorming, and exploration & play are the principle mechanisms by which collaborative creative thinking are fostered within modern corporate American organizations. These organizational dynamics serve as a fuel to creativity. Constraints, competition, disinterest, fear & oppression, inertia, status quo & tradition, insufficient resources & time, peer pressure, poor management, stress & pressure, and unreceptive & close-minded are the dynamics that are obstacles to collaborative creative thinking. The conclusions drawn that these are the dynamics which stimulate and hamper collaborative creative thinking are supported by eminent thinkers that first proposed cornerstone theories related to this focus topic.

Breadth References

Amabile, T. M. (1983). *The social psychology of creativity.* New York: Springer Verlag.

Amabile, T. M., Conti, R., Collins, M. A., Picariello M., Phillips, E., Ruscio, J., Whitney, D. (1996). *Creativity in context: Update to the social psychology of creativity.* Boulder, CO: Westview.

Katz, D., Kahn, R. L., Adams, J. S. (Ed.). (1980). *The study of organizations*. New York: Jossey-Bass.

Katz, D., & Kahn, R. L. (1966). *The social psychology of organizations.* New York: John Wiley & Sons.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday.

Senge, P. M., Kleiner, A., Roberts C., Roth, G., Ross, R., Smith, B. (1999). *The dance of change: The challenges to sustaining momentum in learning organizations.* New York: Currency Publications.

Guralnik D.B. (Ed.). (1984). Webster's New World Dictionary (2nd ed.). New York: Simon and Schuster.

Guilford, J. P. (1967). The nature of human intelligence. New York: McGraw-Hill Book Company.

Core Knowledge Area Modules Number 3 Depth Essay:

Theories on the dynamics of collaborative creative thinking for modern American corporate organizations

Student: Benjamin Cheung

Faculty Mentor: Dr. Teresa Bittner

Faculty Assessor: Dr. Louis Taylor

Walden University

November 23, 2007

Annotated Bibliography

Depth Essay

DEPTH ESSAY

Depth annotated references

Annotation 1: Brophy, D. R. (2006). A Comparison of individual and group efforts to creatively solve contrasting types of problems. *Creativity Research Journal, 18*(3), 293-315. Retrieved October 12, 2007, from the Academic Search Premier database.

Critical Summary

Writing about creative problem solving, or CPS, Brophy (2006) developed tri-level theory of creativity. This theory marries the best aspects of divergent and convergent theory. This union is not a haphazard affair, when the phase of problem solving calls upon defining the problem, generating proposals and studying the problem, divergent thinking is employed. Convergent thinking is put to use when problem solving calls for evaluation, action, and decision making. Often people think that only one form of thinking can be used to solve a problem, but in reality a complex interplay between divergent and convergent thinking will often be more productive. Furthermore the idea that certain personalities can be matched to certain types of problems is investigated by Brophy. This so-called matching theory proposes that people have certain characteristic mental styles, attributes, attitudes, values, beliefs and goals that suit them a certain type of problem. Brophy conducted a study using 326 participants was used to study group creativity.

Critical Analysis

Brophy performed extensive research by employing an interview style method. However, he draws some important, generalized, and sweeping conclusions from this study using an adequate sample size but from a relatively narrow slice of society. His paper was thoughtfully written with good planning, logical reasoning, and lucid use of language. Given that his subjects were students, Brophy's (2006) study fell as potential prey to history and maturation threats. The

given design of their study appeared robust against instrumentation, testing, mortality, and regression threats. Far and away the most impressive aspect of this paper was Brophy's thorough, careful, intensive, and comprehensive research of the background research available in this field. His analysis is credible and appears extrinsically valid. His evaluation of the quantitative data collected uses a good combination of mathematical analysis and discussion. Amabile and Guilford were notable seminal theorists that were identified, evaluated, and cited. His development of the tri-level creative theory will be useful towards a flexible system of collaborative creative thinking.

Annotation 2: Collins, L. (2006). Opening up the innovation process. *IEE Engineering Management, 16*(1), 14-17. Retrieved October 12, 2007, from the Academic Search Premier database.

Critical Summary

Collins described the changing nature of inventive innovative creative research done in modern American corporate organizations. What he terms the linear model of research is giving way to an open innovation model. He described the outdated model as a funnel, where money, resources, people, managers, organizations, and hardware resources are poured in at the top and practical, feasible, achievable ideas pour out the other end. The new model uses collaboration, partnerships, and interaction to produce ideas. The process allows ideas to enter or exit at any stage during the creative process. Collins described ten guidelines for improved collaboration during the creative process including recognizing common interests and setting up guidelines for collaboration. He concluded by outlining two principles for responsible partnerships which entail responsible use and maximum beneficial use of resources. He showed a very interesting graph which shows the amount of research collaboration and outsourcing through the past 80 years in corporations.

Critical Analysis

Collins did a decent job of explaining the changing landscape of research and applied innovation. He uses clear, expressive, and balanced writing. Often research articles are laden with useless passages. They are all too often stuffed with concepts that are inadequately expressed or confusingly written. He established a good case that open, collaborative research will be the principle mechanism for innovation. He brilliantly outlined reasonable, logical, and effective mechanisms by which these collaborations could be set up and maintained. He cited contemporary corporate examples where open innovation has already been quite effective. He

wisely, if cautiously, plays devil's advocate and acknowledged the difficulties and potential problems that will ensue for the move to this new world of open innovation. While he performed no study, he backs up his assertions with a carefully developed train of thought. His use of charts and figures was also incorporated well in his paper. He wielded them as a skilled smithy would employ a hammer. The notion of open innovation will fit well into this paper because the characteristics that define open innovation will play an important part in the communication, synergy, and collaboration section.

Annotation 3: Cooper, P. (2005). A study of innovators' experience of new product innovation in organizations. *R&D Management, 35*(5), 525-533. Retrieved October 12, 2007, from Business Source Premier database.

Critical Summary

Cooper described collaborate creative efforts in modern organizations. He finds the important links between motivation, organizational structure, social networks, and leadership upon collaborative creativity. He analyzed nine elements of motivation and found three of them to be most important to inventive potential. He found creative buzz, tangible benefit, and excitement to be the most important factors among the nine identified. He described a spectrum of organizational structure from organic structure to a hierarchical structure. Social networks that are developed among individuals allow a diversity of ideas and knowledge to be capitalized upon. He identified important sources of conflict which serve to inhibit collaborative creative thinking.

Critical Analysis

Cooper selected the intensive research route by using a small sample of professionals and conducting thorough interviews. The principle problem of intensive research is trying to find a representative sample from the participants chosen. Cooper acknowledged that this is an important potential shortcoming of such research and carefully selected the participants in his study. Cooper uses writing that is understandable, lucid and not confusing. He did a thorough job of investigating the exiting field of research including the citation of the seminal theories of T. M. Amabile. The careful consideration he gave to this historical overview gave his research credibility. The layout and organization of the paper was reasonable. His paper centered on the study he performed. He explains his research methods carefully and thoughtfully. The notions of organic working structures and important motivators for collaborative creative efforts that Cooper developed will play an important role the development of this paper.

Annotation 4: Davenport, G., & Mazalek, A. (2004). Dynamics of creativity and technological innovation. *Digital Creativity, 15*(1), 21-31. Retrieved October 12, 2007, from Academic Search Premier database.

Critical Summary

Davenport and Mazalek described the role of high technology upon modern corporate American organizations as it relates to creativity. The particular application of technology was in creative expression and narratives. The use of technology has changed the corporate landscape. Computers have become incorporated into nearly every aspect of modern businesses. This makes technological innovation important to the success of many corporations. They described several different projects and how they have been used to assist groups. They described the role of technology within a cycle of innovation which starts with the conceptualization of a new idea, experimentation and then onto implementing the idea. The process transforming ideas into tangible, practical, and actual software packages which in turn can further stimulate innovation starting the cycle all over again.

Critical Analysis

As members of the MIT Multimedia lab, their article already garnered a lot of credibility since the lab is one of the most famous in the world for the marriage of technology with creative products. They did a good job at reviewing some historical precedence for their chosen topic. They did not have a particularly powerful conclusion, or one that really required a tremendous amount of theoretical research in order to validate. The organization of their paper was centered on various examples of technological products used to foster creativity. The paper was well written. It would be like the Dalai Lama writing an article on meditation, Buddhism, or peace. Davenport and Mazalek's ideas about the influence of high-technology within modern American corporations upon creativity will play an important role within this paper.

Annotation 5: Dewett, T. (2003). Understanding the relationship between information technology and creativity in organizations. *Creativity Research Journal, 15*(2 & 3), 167-182. Retrieved October 12, 2007, from Academic Search Premier database.

Critical Summary

Dewett focused his paper on the role between information technology and collaborative creativity. He highlighted the role that high-technology plays with respect to enabling communication, codifying knowledge, spanning organizational boundaries. Dewett also wrote about the important stages of creative production. Information technologies facilitate the linking between disparate organizations. Furthermore, he wrote that these technologies can be used to codify valuable organizational information creating a history and serving as a memory. Technology allows boundaries between groups to be spanned. Dewett also pointed to another problem with information technologies that is one of information overload. While technology can facilitate communication and cross-organizational understanding, it also presents problems in trying to manage a deluge of information.

Critical Analysis

Dewett's paper was organized along lines of the areas of influence between information technology and collaborative creativity. It was well laid out and thoughtfully composed. The English and composition of words were well written. He did a good job of analyzing the history in the field and relevant previous research. Dewett intelligently built up his case by interweaving the contemporary researchers along with the seminal theorists. He did a good job of considering different aspects of the interaction between technology and creativity. He drafted a lengthy a thorough conclusion carefully, impressively, and methodically collecting his thoughts together. Dewett's ideas concerning the relationship between information technologies and collaborative creativity will be used throughout this paper, bolstering the conjectures.

Annotation 6: Fairbank, J. F., Spangler, W. E., Williams, S. D. (2003). Motivating creativity through a computer-mediated employee suggestion management system. *Behavior & information technology, 22*(5), 305-314. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Fairbank, Spangler, and Williams analyzed the effect of suggestion systems upon organizational collaborative creativity. He wisely noted that organizations all too often create rigid structures that hinder creativity because they wish to propagate their existing structure and do not wish to disturb the status quo. This causes new ideas and innovative procedures to be undervalued and even discouraged. He also noted how expectancy theory can be used to improve motivation which can foster creativity. This is composed of creating an environment where people can expect to complete tasks; that these tasks will lead to definitive outcomes; and the tasks have high value to the organization. When these aspects come into alignment it augments motivation and stimulates creativity. They considered enterprise-wide group decision support systems.

Critical Analysis

His analysis did not use that much in the way of contemporary research but what it did cite was used judiciously. The language was clear, understandable, and lucid. He got his ideas across without using any convoluted language or concepts. He outlined an effective suggestion system and developed it with reasonable logic. The only flaw with his paper is that he started to discuss the technical details of a very complex, immense, technical, and multi faceted project which is really outside the scope of his paper. The principles he developed for the project was sound and he could spend more time exploring his ideas. The ideas concerning how suggestion systems are used within organizations are insightful, and give valuable clues to motivation and creativity. These insights will be used throughout the paper primarily in the leadership section.

Annotation 7: Gregerman, A. (2007). Unlocking genius in yourself and your organization. *Journal for Quality & Participation, 30*(2), 9-13. Retrieved October 12, 2007, from Academic Search Premier database.

Critical Summary

Gregerman discussed how to unlock the genius within an individual and organizations. He concluded that there are six principle rules of thumb which serve to stimulate, engage, and foster collaborative creativity. The first is to read broadly, frequently, and enthusiastically. The second is to go forth and search for new ideas. The third is to ask questions. The fourth is to engage customers. The fifth is to develop friendships with unusual people. The last is to diversify your interests, skills, and knowledge. These six basic factors play a crucial role in stimulating creativity and maintaining a positive attitude toward new ideas and new perspectives that inevitably follow close on the heels of an innovative spirit. Gregerman also discussed that innovations are rarely produced in total isolation. Often ideas are inspired from other innovations, products, concepts, or ideas.

Critical Analysis

Gregerman has one of most relaxed yet entertaining writing styles of all of the depth articles. The words were engaging, captivating and fun. It was obvious through the words and phrases that he chose that the topic of interest was delightful to him and he wanted to share his passion for the subject with others. While he did not perform much in the way of historical research on his topic, he also did not venture forth any bold new proclamations that leap outside of the realm of common sense. Rather he depended on his witty, engaging and lively writing spirit to captivate and retain his audience. His notions will find an important home in the paper because he wrote quite a bit on attitude and how important it is to explore, play and keep an open mind in order to develop new perspectives and different ways of looking at the world.

Annotation 8: Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization Science, 17*(4), 484-500. Retrieved October 12, 2007, from Business Source premier database.

Critical Summary

Hargadon and Bechky had a very interesting perspective on collaborative creativity. They claimed that creativity within groups does not happen as an individual dynamic or a group dynamic. But, rather there are moments when one crosses over into the other. These moments of collaborative creativity are fostered by four mechanisms comprised of help seeking, help giving, reflective reframing, and reinforcing. Help seeking promotes individuals to actively seek the help of others on the team. Help giving encourages people to willing give help and support. Reflective reframing is a mechanism where people build upon the ideas of others through the use of reflection and reframing. Reinforcing strengthens all of the other mechanisms during the time that those other activities are performed.

Critical Analysis

Hargadon & Bechky's paper was thoughtfully organized, well written, and logically reasoned. They backed up their claims with a good amount of historical precedence and current research. Furthermore, they used extensive research methods by engaging in interviews with people from four different corporations. The design of their methods seemed sound and effective. One of the biggest problems with extensive research is the difficulty in defining causal connections which they mitigated with careful quantitative study of innovative projects, documentation, and technological products. The organization of the paper was easy to understand and flowed nicely throughout. The most insightful and novel development that Hargadon and Bechky had was the concept of reflective reframing. Hargadon & Bechky described this mechanism in great detail and it will play an important role in this paper.

Annotation 9: Kratzer, J., Leenders, R. T. A. J., van Engelen, J. M. L. (2006). Team polarity and creative performance in innovation teams. *Creativity & Innovation Management, 15*(1), 96-104. Retrieved October 10, 2007, from Business Source premier database.

Critical Summary

Kratzer, Leenders, and van Engelen wrote about conflict within organizations and its impact on collaborative creativity. They identified three kinds of conflict task conflict, interpersonal conflict and team polarity. Task conflict arises from differences in opinions and perspectives. Interpersonal conflicts arise from social discord and personality disputes. Finally, team polarity occurs from a variety of opinions competing for attention. They noted that team polarity is a natural part of the creative process because entertaining a multitude of opinions is a part of the collaborative creative process. They also observed that under certain circumstances of low process complexity that team polarity can actually hinder creativity. They designed a study involving 51 innovation teams in eleven companies.

Critical Analysis

The language they chose to use was bloated and at times needlessly obtuse. However, this was offset because in their paper was so well laid out and their primary points were repeated no less than three times, once as an overview, once in depth, and once during the conclusion. They chose to perform an intrinsic study utilizing quantitative measurements on a large cross section of corporate projects dealing with collaborative creative products. Though the measurements they took were subjective in nature, the data collected was methodically analyzed and statistically evaluated. The conclusions they drew were not far fetched and reasonable from the data that was collected. Kratzer et al. had by far the most insightful notions about conflict of any of the researchers. The insights that they found through their research on the companies they investigated will prove invaluable in the conflict dynamic of collaborative creativity in this paper.

Annotation 10: Mamykina, L., Candy, L., Edmonds, E. (2002). Collaborative creativity. *Communications of the ACM, 45*(10), 96-99. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Mamykina, Candy, and Edmonds described some aspects of collaborative creativity as per the title of their article. They identified three main components to collaborative creativity, that of creative conceptualization, realization, and evaluation. Individuals in a group each adopt particular roles related to the particular component. Creative conceptualization starts with the initial concept phase and idea generation. The realization component involves the implementation of the idea. They outlined two models to think about the activities of creativity. The first is the assistant model and the second is the partnership model. The assistant model also referred to as the conveyer model is a model where people join a project for a limit time as an assistant and then leave the project. In the partnership model, partners assist in the project in a more complete role.

Critical Analysis

Mamykina, Candy, and Edmonds organized their paper in a logical and reasonable fashion. The language they used was clear and understandable. Their proposal of a system to exchange ideas within an interdisciplinary group using computing technology was adequately backed up with reasonable ideas. They performed no study buck back up their ideas with contemporary research. Their principle conclusion was that collaborative creativity engenders the development of innovative ideas. They backed up their claims with a cadre of current researchers in the field and interwove them throughout their paper. Since this paper is on the mechanisms of collaborative creativity their ideas will support the conjectures of this paper nicely. They described interesting aspects of collaborative creativity such as the conveyer model.

Annotation 11: Nijstad, B. A., & Stroebe, W. (2006). How the group affects the mind: A cognitive model of idea generation in groups. *Personality & Social Psychology Review, 10*(3), 186-213. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Nijstad and Stroebe claimed to take a social-cognitive approach as opposed to a social-motivational approach to collaborative creativity research. This means that they argued that creative production is an act of thinking based on things which improve or hinder thinking. They developed the idea the evaluation apprehension, social loafing, social matching, and production blocking are important factors that serve to hamper collaborative creativity. They argued that creativity fundamentally requires some memories upon which to build new ideas from. Evaluation apprehension occurs when people are unwilling to share their ideas with others. Social loafing occurs when people do not pull their own weight because of the anonymity of the crowd. Social matching describes the situation where the crab that tries to escape the bucket is pulled back into the rest of the pack. Production blocking happens when people are not able to get their ideas out when they need to take turns with other people.

Critical Analysis

Nijstad and Stroebe put forth some insightful and interesting idea regarding the dynamics of collaborative creativity. Their paper was well researched diving back into the history of creativity research and they drew upon luminaries to bolster their conjectures. The paper was well organized and thoughtfully composed. The phrasing and language left something to be desired. The words they chose to use were not plebian and served to hinder comprehension of their concepts. Nonetheless, the central ideas of their cognitive based collaborative creativity were apparent. The cognitive based approach and ideas on cognitive creativity that Nijstad and Stroebe developed will play an important role in the collaborative dynamics for this paper.

Annotation 12: Pipinich, R.E. (2006). High-stakes creativity. *Industrial Engineer, 38*(6), 30-35. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Pipinich raised the important of collaborative creativity to a new high. Creativity is vital to the health of modern corporations. He wrote that individuals within these organizations must learn to see new insights and develop new perspectives. He identified three aspects that were common to the innovative teams that he investigated. The first was that they were intentionally isolated in order to give the team freedom away from the distractions of everyday routine chores. In other words, the groups were given specific time for reflection and collaborative creativity. Secondly, individuals derived great satisfaction from their creative products. And last, the teams were given the freedom and autonomy to experiment. These vital aspects of fostering collaborative creativity can further be inspired through rewards and holding brainstorming sessions. He then continued to outline some of the practical pitfalls and strengths of brainstorming.

Critical Analysis

Pipinich had a loose and engaging writing style. It was clear he was in this game to communicate his perspectives and not out to confuse the reader. He spent time to carefully craft his sentences. He backed up his assertions with actual corporate examples of innovation. He started off his paper with the analysis of the creative work behind the American military's latest jet fighter, the F-35 Joint Strike Fighter. He then went on to analyze many insightful examples of collaborative creativity. Behind some fancy pictures that littered his paper was a grim and gritty message. Corporations must learn to foster collaborative creativity if they are to survive. Obviously, his insights are important because his thesis aligns with the study of collaborative dynamics within modern American corporate organizations.

Annotation 13: Powers, J., Cumbie, S. A., Weinert C. (2006). Lessons learned through the creative and iterative process of community-based participatory research. *International Journal of Qualitative Methods, 5*(2), 1-9. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Powers, Cumbie, and Weinert described and investigated collaborative creativity and research dynamics. They pointed to the benefits and usefulness of collaboration and interdisciplinary teams. However, they also noted many of the difficulties that arise. They cited several examples of research projects and different phases of those projects and the difficulties that presented themselves with regards to collaboration. The indicated that differences in thinking, paradigms, relationships, objectives, and timelines can prevent two groups from collaborating with each other. There are also numerous benefits to collaboration including productivity grains, improved quality, professional acceleration, social support, and a greater pool of available resources. They indicated several important aspects of participatory and collaborative creative efforts. They described a continuum of linear versus an iterative process of getting the people to work together. They also described how having a clear initial agenda, and careful evaluation of outcomes.

Critical Analysis

While there were quite a number of articles cited, one shortcoming was a more cogent line of historical analysis as it relates to the present research. The paper could have been organized a little better as the discussion of the projects studied and their insights were scattered throughout the paper. The discussion and conclusion were interesting and captivating. The ideas they entertained were refreshing and novel. Their insightful observations about the downside to collaboration will prove to be valuable in this paper. They were the one of the few researchers to point out that there are times where collaboration just isn't right.

Annotation 14: Redelinghuys, C., & Bahill, A. T. (2006). A framework for the assessment of the creativity of product design teams. *Journal of Engineering Design, 17*(2), 121-141. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Assessing creativity is perhaps one of the most difficult things that a researcher or corporate manager could possibly do. Assessing any social or human quality would probably just as difficult. How can you quantitatively measure motivation, happiness, or love? Redelinghuys and Bahill proposed a quantitative scale to rate, rank and assess creativity. They termed their system the REV method, comprised to resources, effort and value. They presented an equation called a resource-based relative value (RBRV) model. As a product of three factors, the relative practice costs, total work and amortized value for the opportunity cost of specialized training. One very interesting thing about the article is that they differentiate between the terms train creativity and achievement creativity. That is the innate quality or characteristic of a person's creative capacity versus the deliberate and methodical attempts at producing works of novel innovation.

Critical Analysis

Redelinghuys and Bahill tackled an extremely difficult to tackle thing, the quantitative measure of quality as measured against resources, effort against the produced value of achievement creativity. They showed charts and equations and constructed a basis for the relative assessment of creative products. They made a strong case that measuring productive output can play a key and vital role in the understanding of resource allocation, management and garnering of support for creative endeavors. If there are long periods of time where creative efforts need to incubate and do not produce a commercial product, some other way might need to be used to justify the allocation of resources to foster such creativity within modern American corporate

organizations. This is particularly insightful and the attempt to generation such a measure if obviously not trivial. They wrote eloquently and interspersed their writing with their equations and graphs which showed resource and effort versus value. The paper proceeded from historical attempts to quantitatively assess creativity to their present method. It was laid out in a logical and easy to understand fashion. Their only shortcoming was some lack of external validity. They set for a qualitative vision to explore the new world, but need a flotilla of actual creative vessels to carry out their mission. The thoughts about the process of creativity and the management of creativity add valuable new insights and will play an important part in this paper.

Annotation 15: Thompson, L. (2003). Improving the creativity of organizational work groups. *Academy of Management Executive, 17*(1), 96-109. Retrieved October 12, 2007, from Business Source Premier Database.

Critical Summary

Thompson described four principle roadblocks to collaborative creativity as social loafing, conformity, production blocking, and downward norm setting. Social loafing occurs when individuals slack off. Conformity occurs when members succumb to peer pressure. Production blocking occurs because people need to take turns explaining ideas. Downward norm setting is a lowest common denominator effect that plagues groups. She then explained ten techniques that could circumvent the roadblocks which included diversifying the team, analogical reasoning, brain-writing, nominal group technique, creating organizational memory, trained facilitators, high benchmarks, membership change, electronic brainstorming, and creating a playground. Analogical reasoning is a technique that transfers ideas from one domain to another. Brain-writing is brainstorming that incorporates a writing step. Nominal group technique is an interactive, and modified brain-writing method. High benchmarks provide feedback to participants in a brainstorming session.

Critical Analysis

Of all the current researchers investigated, Thompson stood out at the most interesting, organized, lucid, and insightful. Her writing was outstanding, elegant, clear, and to the point. She deftly employed illustrative and appropriate examples to illustrate her main points. Thompson's command of language comes with the highest recommendations. However, it was her forte of logical, reasonable, and brilliant organization that won the day. Her build up of a chart of techniques measured against creativity roadblocks was impressive. The tight integration and smooth flow of the article was worth its weight in gold. She skillfully employed a cadre of

researchers and theorists to back up her claims. The appeal of her writing is that she gets to the point without forfeiting any ideas or clarity. She peeled away the chaff and presents the reader with a mental nugget of gold. The lucid and clear exploration of collaborative creative production methods produced by Thompson will play a vital role in this paper as none of the other researchers dove into some of the techniques that were explained by Thompson.

Annotation 16: Vera, D., & Crossan, M. (2005). Improvisation and innovative performance in teams. *Organization Science, 16*(3), 203-224. Retrieved October 10, 2007, from Business Source Premier Database.

Critical Summary

Vera and Crossan described how the principle tools of improvisational performance can translate into collaborative creativity mechanisms within modern American corporate organizations. The key tools for improvisational performance are practice; collaboration; agree, accept, and add; be present in the moment; and draw on reincorporation and ready-mades. Practice directly translates into training within organizations, keeping members informed and developing expertise. Collaboration goes to the heart of team work, building a culture that promotes trust. Agree, accept, and add reflects an attitude that members must build upon each other's ideas; they must be willing to experiment. Be present in the moment is a rule which states that people should be mindful of the activities that they are currently engaged in. People should focus on the moment and pay attention the real time information and real-time communication taking place with their team mates. Draw on reincorporation and ready-mades means using organization memory, and a history of previous experiences of the group.

Critical Analysis

Vera and Crossan opened up a mental door which I had not previously known existed. Improvisational performances have a deep structure and facile rules that facilitate collaboration. Of all of the research articles I read, Vera and Crossan's was the most moving. Their words about team work struck home when brought under the spotlight of improvisational performance. On stage, in a live performance one has to think on their feet, one sinks or swims depending on one's team mates. They did an outstanding job at translating the lessons learned from improvisational performance to modern corporate organizations. Their writing was clear and

understandable. While perhaps their organization left something to be desired, they made up for it with insightful perspectives. After someone reads their article they will not think about collaborative team work the same way ever again. They studied 25 work teams comprised of 175 employees using an intrinsic study employing surveys with quantitative measurements. They did an admirable job of mathematically digesting the data and formulating conclusions from their measures. Their insight into how improvisational team skills translate into skills that facilitate collaborative creativity will be invaluable in this paper. Perhaps no other contemporary researcher had such interesting insights into how to put magic into team work.

Annotation 17: Vidal, R., Mulet, E., Gomez-Senent, E. (2004). Effectiveness of the means of expression in creative problem-solving in design groups. *Journal of Engineering Design, 15*(3), 285-297. Retrieved October 12, 2007, from Academic Search Premier Database.

Critical Summary

Vidal, Mulet, Gomez-Senent explored a technique referred to as *objectual brainstorming*. They first described various kinds of brainstorming including verbal or sentential brainstorming, brain writing, and brain sketching. In the traditional form of brainstorming ideas are expressed verbally. In brain writing, people write down their ideas silently. In brain sketching, they draw pictures to create an idea. In objectual brainstorming, objects are used as components to a spontaneous prototype that springs forth from the minds of the participants. The objects can be building blocks like Legos. The authors suggested Meccano pieces. They performed an extrinsic study with 12 experiments with 60 designers. They then studied the results from objectual brainstorming and compared them to sentential brainstorming and brain sketching. They concluded the objectual brainstorming beats traditional brainstorming for functional problems.

Critical Analysis

Explain in clear and straight forward language, Vidal et al. did a good job of explaining objectual brainstorming. Their comparison to the other brainstorming techniques was logical and sound. Their analysis of their extrinsic study fostered external validity. Their careful consideration and logical development gave credence to their conclusion. Their concepts of link density and explanation of *linkographs* was also insightful. Their down to earth approach allowed people to connect to their work. Brainstorming has been chosen in this paper as one of the thinking mechanisms that facilitate collaborative creativity. Since the focus of their paper was on various types of brainstorming, the ideas of Vidal et al. will play an important role in the brainstorming section of this paper.

Introduction

This paper will investigate the dynamics behind collaborative creativity within modern American corporate organizations. “The creative process should be recognized for what it is, a mental process to derive original, valuable, and adaptive products and processes” (Pipinich, 2006, p. 35). Again, creativity shall be used in this paper to mean intellectual inventiveness exhibiting originality, ingenuity, or imagination as applied to a problem, process, response, or concept. Redelinghuys and Bahill (2006) wrestled to the ground that creativity can be treated as a character trait, or it can be thought of as an achievement which is “the ability to actually produce works that are novel” (p. 122). The study of a creative trait square belongs in the camp of psychologists and biologists. This paper will focus on creativity as an achievement tumbling it into the camp of business, management, and corporate enterprise. Though there are terms meaningful to both camps, such as *mental fluency* (Thompson, 2003, p. 105) reflecting a quantity of ideas generated and *mental flexibility* (Thompson, 2003, p. 105) indicating the variety of ideas spawned. A useful contribution came from Thompson (2003), “creativity is the production of novel and useful ideas” (p. 96).

The importance of innovation is vital in the modern American economy. Cooper (2005) described innovation as “invention to meet a market need” (p. 525) which merges the twin brothers of creativity and implementation. Collaborative creative thinking works to generate inventiveness in modern corporate American organizations. Modern technology and computing has changed the economic landscape, favoring those corporate American organizations that can generate inventive innovation. “New technologies will inevitably transform distribution paradigms, mediate formative social practice and grow new market opportunities” (Davenport & Mazalek, 2003). Dewett (2003) chimed in that “creativity is vital to organizational success” (p.

167). The opening shots of Fairbank, Spangler and Williams (2003) stated "to survive and prosper in today's intensely competitive and complex environment, organizations must innovate" (p. 305). Kratzer, Leenders, and van Engelen (2006) took a pragmatic approach to defining creativity "in the sense of generating new ideas, methods, approaches, inventions, or applications" (p. 98). Pipinich (2006) added "creative solutions from associates at all levels is a competitive advantage and a key to the long-term success of manufacturing and service organizations" (p. 31). Collaborative creativity should be "the ultimate source of every successful organization's competitive advantage and its ability to improve" (Pipinich, 2006, p. 35). Hence understanding, encouraging, developing, guiding, harnessing, and supporting the creative dynamics that underpin collaborative creativity within modern American corporate organizations is vital to their success and economic well being. Redelinghuys and Bahill (2006) stated "business success is influenced by the creativity of the development team" (p. 121).

Group interaction dynamics that facilitate collaborative creativity

Autonomy, freedom, control, & choice

Organizational structure also plays a role in fostering autonomy and freedom with regards to collaborative creativity within modern American corporate organizations. Amabile (1996) noted the importance of choice in fostering collaborative creativity. Cooper (2005) bolstered this claim that there are two primary types of organizational structures, *organic structure* and mechanistic / hierarchical structure. Organic structures foster encourage "self-organized styles of innovator-led activity" (Cooper, 2005, p. 528). Organic structures, Cooper (2005) argued leads to flexible organizational systems. Dewett (2003) noted that information technologies "may facilitate increased autonomy and discretion" (p. 171).

Autonomy that grants a degree of mental latitude allows individuals to set sail on innovative voyages. Fairbank et al. (2003) noted that "jobs that involve challenge, autonomy, and feedback promote creativity. In addition, a sense that the work is significant can promote intrinsic motivation and creativity" (p. 307). Given interest and autonomy, inventors are motivated to see what other miss. The key is to "see the possibilities" (Pipinich, 2006, p. 30) that others miss or overlook. He proposed that intentional isolation makes time for reflection. Pipinich (2006) observed that temporary isolation can release the mind from the drudgery of everyday chores and their "associated distractions, enabling an intense focus on the problem at hand" (p. 32).

Challenge & task involvement

All organizations divide tasks within the group. Redefined tasks, task challenge, task involvement, and job freedom are important aspects of managing labor division. Katz, Kahn, and Adams (1980) championed the idea that task challenge fosters creativity. Brophy (2006) espied that "personal knowledge, attitudes, and goals existing in a social context offering opportunities, resources, and rewards" (p. 300). He continued that these fingerprints of character should be matched to a task that suits the individual thereby promoting collaborative creativity. Fairbank et al. (2003) extolled the virtues of challenging and interesting tasks to stimulate collaborative creativity. Fairbank et al. (2003) wrote that "high expectancy" (p. 308), "high instrumentality" (p. 308), and "*high valence*" (p. 308) are the three legs of a motivation tripod. Fairbank et al. (2003) wrote that these factors are expectancy of task completion, instrumental potential, and "the outcomes for completing the task are attractive" (p. 308). Valence implied that "the employees have to value those outcomes" (Fairbanks et al. 2003, p. 308). Gregerman (2007) similarly noted

that “engaged people are challenged to rediscover the wonder and curiosity of their childhood in a focused and passionate way” (p. 11).

Another important aspect of task involvement is mindfulness. Hargadon and Bechky (2006) insightfully defined that “mindfulness describes the amount of attention and effort that individuals allocate to a particular task or interaction” (p. 486). Mindfulness improves concentration and the focus needed to stimulate creativity. It also oils the gears of group collaboration. Hargadon and Bechky (2006) stated that “the attention and energy that an individual commits to a particular interaction with others in the group” (p. 486) facilitate group collaboration.

Climate & culture

All organizations have some sort of culture. The diversity of team, diverse cultures; and changing membership bring unique perspectives to the group. A good culture can foster trust, openness and the sharing of ideas. Some cultures will encourage risk taking which, in turn, fosters collaborative creative thinking. Additionally diversity in the team will also foster people to seek minority viewpoints. This, in turn, will produce varied viewpoints, different perspectives, colorful experiences, and diverse cognitive styles all of which foster creativity. Katz and Kuhn (1966) paraded the importance of culture to an organization. Mamykina, Candy, and Edmonds (2002) harbored the same notion that culture plays an important part in collaborative creativity. They summarized that “the atmosphere of trust, encouragement, and risk-free exploration as well as incentives for creative investigation is a necessary part of any creative culture” (p. 99). The social atmosphere that gets created when people come together can supercharge collaboration or trap hopeful attitudes in social quicksand. An open, sharing, trusting culture will foster creativity, collaboration, and productivity.

An interesting part of a group's culture and climate is their history. Individuals will band together under crisis or external attack. As the group works together, wins together, loses together, survives together they will naturally develop a way of adapting to each other. In other word, they will produce a group culture. Powers et al. (2006) supported this notion by stating that groups "build together, *unbuild* together, and become the stronger for having done so" (p. 8). Teams "learn from both their success and failures and thus gain a better understanding and control" (Powers et al., 2006, p.8). Collaboration, participation, partnership, and synergy within modern American corporate organizations are a "complex and iterative process, which can change, grow, or diminish" (Powers et al., 2006, p. 8). Redelinghuys and Bahill (2006) rode the second seat in the tandem bicycle of the history aspect of culture. They wrote that "historic eminence is a reliable and valid measure of creativity" (Redelinghuys and Bahill, 2006, p. 122).

Redelinghuys and Bahill (2006) also noted the importance that culture plays on collaborative creativity. They acknowledged that when creativity is considered as an achievement it is tied to "various cognitive, personality, and environmental variables" (Redelinghuys and Bahill, 2006, p. 122). Redelinghuys and Bahill (2006) described the six factors of the *investment model* with the creative resources of "intelligence, knowledge, intellectual style, personality, motivation, and the environment" (p. 122) as the input and innovations as the output.

Collaboration, communication & synergy

Cooperation, coordination, communication, conflict resolution, cohesion, comfort level, support, common needs, negotiation, common interests, social networking, shared mental models (Senge, 1990, p. 8), sharing knowledge, group learning (Senge, 1990, p. 8), common understanding, and synergy are all ways that collaboration can occur among individuals within

groups. Cooper (2005) invitingly noted that "communicative interaction" (p. 526) plays a vital role in collaborative creativity. Cooper (2005) labeled interpersonal communication networks that promote a diverse understanding within groups as *diversity nets*. Cooper (2005) astutely observed that information can also come from external sources, or 3rd parties. He wrote "ideas can come from external as well as internal sources and can enter the innovation process at any stage" (Collins, 2006, p. 15). Mamykina, Candy, and Edmonds (2002) represented another voice in the chorus of how important communication is to collaborative creativity. They wrote that members must "understand and learn each other's professional jargon" (p. 98); and that they needed to "capture, annotate, and reuse custom vocabulary" (p. 98). Through the codification of pattern languages communication and creativity is fostered.

In a similar fashion to Cooper (20050, Collins (2006) also acknowledged the power of collaboration. Collins (2006) described a *linear model of research* versus an *open* (collaborative) *model of research*. Modern corporations need "to adapt to a world in which the key to successful innovation lies as much in an ability to collaborate" (Collins, 2006, p. 14) as it does other things. Collins (2006) also astutely noted that collaboration can be with academic as well as between groups, companies, or organizations. Davenport and Mazalek (2003) also placed communication as one of the crown jewels of collaborative creative thinking. They astutely observed that communication is "shaped by sensory observation, cognitive interpretation, and the desire to share our experience with others" (Davenport & Mazalek, 2003, p. 21). Hargadon and Bechky chimed in that one can think of "collective creativity by framing the phenomenon as a moment when individuals come together to find, redefine, and solve problems that no one, working alone, could have done as easily" (p. 487).

Furthermore, Davenport and Mazalek (2003) identified an important characteristic of modern American corporations which many other researchers missed. That is, modern computer technologies "encouraged communication and cooperation among widely dispersed participants" (p. 28). Not to be left out in the cold, Dewett (2003) also claimed that "electronic communication increases the overall amount of communication in the organization" (p. 168). Moreover, he astutely observed that they link people "both within and between functions and divisions" (Dewett, 2003, p. 168). Information technologies, Dewett (2003) noted, facilitates the ability of individuals to search, share, and monitor information across group, domain, functional, and organizational boundaries. Mamykina, Candy, and Edmonds (2002) also acknowledged that information technologies that allow people to creatively collaborate. "When the right tools are available, greatly reduce the risk of misunderstanding and fruitless arguments" (Mamykina, Candy, & Edmonds, 2002, p. 98). Software programs can allow groups to share ideas, draw charts, compose ideas, sketch concepts, and produce prototypes.

Gregerman (2007) identified a completely different kind of collaboration than any of the other researchers of theorists. That is, collaboration with history. He wrote that "even the most brilliant ideas have always been inspired by something that someone else has done, thought, or dreamed (Gregerman, 2007, p. 11). Gregerman (2007) produced many good examples including the fact that "burrs inspired Velcro, and birds were inspired planes" (p. 11). Indeed, ideas rarely form completely within a vacuum or in an ivory tower; they are often sparked off from the kindling of other people, history, and other past innovations.

The study, understanding, and insight into human behavior are fraught with pitfalls. Hargadon and Bechky (2006) brilliantly observed that there is often not a definitive line in the sand that states that on this side of the line is collaborative creativity and on that side of the line

is individual creativity. “The locus of creative problem solving shifts, at times, from the individual to the interactions of a collective” (Hargadon & Bechky, 2006, p. 484). They argued that creativity comes in momentary spurts of creativity mixed ongoing deliberate efforts.

Mamykina, Candy, and Edmonds (2002) brought attention upon a mental tsunami. They proclaimed the importance of collaboration for the development of creative products. “A more complicated picture of creativity that highlights the importance of social interactions, mentoring, and collaboration in creative work” (Mamykina, Candy & Edmonds, 2002, p. 96). Another vital aspect of collaborative creativity within modern American corporate organizations is interdisciplinary work. Interdisciplinary research and development can take many forms including the development of new products, innovations, and technologies through the combination of different sciences, disciplines, specialties, or hybrid technologies. The “most creative pursuits in industry involve interdisciplinary teams working together to develop a product that cannot be created by a single individual alone” (Mamykina, Candy & Edmonds, 2002, p. 96). Vera and Crossan (2005) examined how the spontaneous and creative skills of improvisation can be applied to collaborative creativity. They also pointed to the importance of the quality of team work. They argued that team members need to be coordinated, responsible, interdependent, and heedful for other members. Vera and Crossan (2005) wrote that team mates must care for each other and reduce not increase their stress.

In the modern American organization, technology can foster collaborative innovation and collaboration. Friedman (2005) identified ten technological forces for collaboration including democracy, the internet, work-flow software (p. 71), open-source self-organizing communities (p. 81), outsourcing, off-shoring, supply-chaining, *in-sourcing* (p. 141), informing (p. 150), and

enabling technologies. He noted that "open-sourcing as a tool to drive software innovation within companies" (Friedman, 2005, p. 92) is effective.

Incentives, rewards & recognition

Collaborative creative groups are composed of people. People are human, motivated by desires and a thirst for recognition and appreciation. This notion was given a bedrock foundation by Amabile (1983). Mamykina, Candy, and Edmonds (2002) added another layer of sediment to the concept. They wrote "strong involvement, influence, and leadership by a collaborator" (Mamykina, Candy & Edmonds, 2002, p. 97) supercharge collaborative creativity. Pipinich (2006) added that "*extrinsic* and *intrinsic rewards* of achieving a creative solution" (p. 34) play a vital role in collaborative creativity. Extrinsic rewards are bestowed upon individuals such as monetary rewards, recognition rewards, or promotion opportunities. Intrinsic rewards are sense of personal worth, contentment, and happiness. "For some individuals, the need to express creativity can be as strong as the desire for nourishment" (Pipinich, 2006, p. 34).

Flexibility & versatility

Collins (2006) observed that the nature of challenges presented to modern corporations includes globalization, knowledge driven economies, and a changing environment. In light of these factors, modern corporate organizations need to be flexible, versatile, and adaptive. Powers et al. (2006) noted that versatility and *collective efficacy* (p. 2) represent collaborative efforts to attain a shared goal. When the group is willing to work together, it has the opportunity to be efficient. They are "strengthened through this ongoing dialogue, analysis, and iterative change" (Powers et al., 2006, p. 2).

One important aspect of flexibility and versatility is being able to employ different perspectives on a situation. "We can only do things differently if we see things differently"

(Gregerman, 2007, p. 11). Seeing a problem or situation from a different angle will inspire collaborative creativity. New solutions, new alternatives, and new things that you might not have otherwise noticed will become evident if people are willing to be flexible in their perspectives.

Goals & values

Stating beliefs and understanding values within a partnership or group can assist in collaborative creativity. Collins (2006) noted that it is essential to "identify common interests and needs" (p. 15), and to "start collaborations by identifying expectations and stating objectives clearly" (p. 15), and "developing trust" (p. 15). These factors play a vital role in collaborative creative production. Common interests, values, and goals bring teams together. For teams that are aligned in interests, the creative skies are the limit. "In a full partnership situation, complementary interests exist even where the outcomes by each individual party may differ" (Mamykina, Candy & Edmonds, 2002, p. 97). They wisely wrote of mutual benefit and complementary roles which foster collaboration.

Dewett (2003) touted that information technologies can be used to "facilitate the sharing of beliefs, values, and norms" (p. 175). Additionally, it can be used to convey goals, missions, values, visions, goals, strategies, and procedures. Fairbank et al. (2003) underscored the importance of flexibility by emphasizing that innovation and global competition presents a wealth of new opportunities and threats to the survival of an organization.

Leadership, empathy & motivation

Trained facilitators, good management, leaders and people of influence can powerfully motivate collaborative creativity. Motivation is a powerful ally in the quest for collaborative inventiveness. Motivation can kindle a desire to create, focus a group, encourage persistence, and incite groups to seek success, engender feelings of satisfaction, improve expectations for success,

and get individuals to set high benchmarks. The idea that intrinsic motivation plays a vital role in collaborative creativity was the brainchild of Amabile (1983). Cooper (2005) supported the notion by identifying nine incarnations of motivation. He stated that *creative buzz* (p. 528), tangible benefit, and excitement (p. 528) are the most important aspects of motivation. Creative buzz is defined as the increased activity surrounding the generation of new ideas. Cooper (2005) noted that seeing "management as a service rather than by seniority, and support in discussion with others." (p. 532) are important to "innovation leadership" (p. 532). Mamykina, Candy, and Edmonds (2002) joined the band with a collaborative banjo. They developed an paradigm called the *assistant model* "where collaborators assume the responsibility for different phases of the project, and often even join the project for a brief time and leave after fulfilling their parts" (p. 97). Leadership can mean giving direction and directions but it can also mean providing the necessary for collaborative creativity to thrive. They also noted that the assistant model is also referred to as the *conveyer model* (Mamykina, Candy, & Edmonds, 2002, p. 97).

Motivation plays an important role in stimulating creativity. This assertion is backed up by Fairbank et al. (2003) "intrinsic motivation elicits and promotes the generation of creative ideas" (p. 307). Pipinich (2006) dove in with the sentiment that satisfaction is vital to collaborative creativity. He identified one of the three elements of creative production as "the team members derived notable enjoyment and satisfaction from their creative solutions" (Pipinich, 2006, p. 31). The situation can be a chicken and egg scenario. Good leadership provides a culture which fosters collaborative creativity. Powers et al. (2006) observed that benefits include "increased productivity, better quality, mutual and reciprocal professional development and mentorship, support and encouragement, and expanded accessibility to expertise and resources" (p. 7). Leadership certainly facilitates collaborative creativity, and in

turn as the team becomes more creatively productive, leaders gain access to more opportunities. These opportunities often grant a chance to develop better leadership skills and resources. It gives the team a chance "to adapt an attitude of not posturing, minimizing, or running away from realities" (Powers et al., 2006, p. 8).

Thompson (2003) described a term called *flow* (p. 101). When groups are highly motivated and members feel productive they enter a positive, motivated, productive state of mind known as flow. "The idea of flow is that an activity is challenging enough to be interesting and rewarding" (Thompson, 2003, p. 101). Flow generates enough motivation that people are inspired to undertake the rewarding activity for its own sake.

Leadership does not just mean administrative managerial work, it means expertise and excellent within an organization. Vera and Crossan (2005) noted that one of the five principle rules of improvisational performance is practice which translates to expertise in modern corporate organizations. Vera and Crossan (2005) claimed that the greater the group's expertise, the more productive the "relationship between collective improvisation and innovation" (p. 206).

Sufficient resources & time

Adequate resources and sufficient time fosters collaborative creativity. Katz et al. (1980) observed the importance of having adequate resources upon collaborative creative production. This conjecture is also supported by numerous researchers. Dewett (2003) also noted that technology as a resource can be used to improve communication and augment the collective knowledge base of the organization. "Time has, however, been recognized as a key ingredient for creative behavior" (Dewett, 2003, p. 173). Dewett (2003) added that "adequate resources are a requirement for optimal creativity in organizations" (p. 177). Friedman (2005) observed that one fundamental resource of modern economies is fiber optic infrastructure. He noted that a glut

of high speed fiber infrastructure has allowed American corporations to outsource and increase international collaboration. Many developing economies "benefited from the overcapacity in fiber optics" (Friedman, 2005, p. 104).

Another important aspect of resources is the management of those resources. Power et al. (2006) identified that this was indeed an important aspect of collaboration. Teams need to learn how to "schedule, undertake, and process the results" (p. 4) of different kinds of information and resources. Redelinghuys and Bahill (2006) flew as the wingman of Power et al. (2006). They also indicated the intricacies of managing resources with respect to the success of collaborative creativity. "Design type, the complexity of knowledge required, the number of major subsystems, quality requirements, manufacturing process design, and unit sales price requirements" (Redelinghuys and Bahill, 2006, p. 122) all eventually translate into resources of information, finances, manpower, skills, and equipment that has to be adequately accounted for and managed. This fed into their resources, effort, and value (REV) framework (Redelinghuys and Bahill, 2006, p. 123) that they developed to study collaborative creativity. Redelinghuys and Bahill (2006) concluded that resources can be seen as the "measure of external support, team size, education and experience level, and development facilities used" (p. 123). Redelinghuys and Bahill (2006) wrote that the integration of methods, "procedures, methods, and techniques for designing" (p. 126), administrative skills, "tools, standards, codes, regulations, and patent" (p. 126), product markets, organizational experience, and resources comes together to determine creative success. Typically, in an organization resources are carefully parsed, controlled, and doled out. Redelinghuys and Bahill (2006) added that organizations must either maximize the use of these resources or learn to work with a "reduction in required development effort or resources, or a combination of these effects" (p. 126).

A subtle but important aspect of time management is having the presence of mind to be in the moment. Vera and Crossan (2005) explained that one of the five rules of improvisation is to "be present in the moment" (p. 208) which translates into effective use of real-time information and real-time communication. Individuals must learn to use their time wisely so that they can have time to pay attention to their team mates. "A lack of attention and alertness to the information" (Vera & Crossan, 2005, p. 208) arriving to people will cause errors, conflict, and frustration. Adequate time to perform assigned tasks also means that the individuals in a group must be mindful of their time. They need to pay attention to what is going on in the present moment to make the most of that moment. Friedman (2005) supported the notion that pertinent information on demand fosters productivity by what he called *In-forming* (p. 150). In-forming is the use of advanced search and information technologies to retrieve, access, and filter data.

Vera and Crossan (2005) described another of the five rules of improvisation that deals with *reincorporation* and *ready-mades*. This represents an informational resource concerning the past history of the group. A memory of the present task, and critical experiences learned from tasks undertaken. Steel is forged through fire. When this resource is available, the group can reincorporate them into present activities, and *free associate* (Vera & Crossan, 2005, p. 208) current circumstances to those experiences. Vera and Crossan (2005) demonstrated that it is not just sufficient to have resources, but that the right kind of resources determines the success of collaborative creativity.

Vera and Crossan (2005) insightfully suggested that organizations would do well to encourage teams to "reflect on the kind of information they need to be responsive in their jobs" (p. 221). Before an organization can provide adequate resources individuals must first understand what resources they need to foster collaborative creativity. Furthermore, organizations should

provide the necessary resources to "promote mechanisms to establish fluid communication flows" (Vera & Crossan, 2005, p. 221). The promotion of social networks is one way to develop good communication within the team, but another way is to provide sufficient communication tools that also engender good communication.

Thinking mechanisms that facilitate collaborative creativity

Assumptions, perspectives & evaluation

Stating assumptions, investigating premises, sharing expectations, and identifying organizational memories up front will steer the vessel of group thinking in the proper direction even in turbulent waters. Congruent perspectives and accurate perceptions that model reality will give the group enough firepower to wage war against difficult challenges. Good judgment, making rational choices and fair idea evaluation will provide the mental stability need to guide a group through the dark forest of problems they will encounter. Dewett (2003) claimed that the five steps of the creative process are "problem or task identification, preparation, response generation, response validation and communication, and outcomes" (p. 171). The last three stages underscore the important role that evaluation plays in creativity.

Evaluation is an important part of creativity. For example, in a brainstorming session a quantity of ideas is encouraged, but eventually the many different flavors of ideas must be narrowed down to a few ideas to implement. Mamykina, Candy, and Edmonds (2002) defined the three main activities are "creative conceptualization, realization (or implementation), and evaluation" (p. 96).

Brainstorming, brain-writing & brain-sketching

Brain writing was described by Brophy (2006) was a method where people write down ideas and then pass those ideas on to other individuals. The individuals then build upon the ideas

that they are passed. This allows ideas to snowball and gain momentum within the group. The benefits Brophy (2006) touted were that it "avoided idea blocking and permitted anonymous contributions" (p. 299).

Hargadon and Bechky (2006) acknowledged that brainstorming was an effective mechanism that can be used by groups as a mechanism for collaborative creativity. They indicated that "subsequent brainstorming meetings" (Hargadon & Bechky, 2006, p. 485) can be used to further develop proposals. While nearly every other contemporary research article on collaborative creativity mentions brainstorming, only Hargadon and Bechky (2006) observed that the selection of individuals plays an important part in the brainstorming process. "Participation in a particular problem-solving process depended on who was invited to do so" (Hargadon & Bechky, 2006, p. 490). Following on the heels of Hargadon and Bechky, Nijstad and Stroebe (2006) indicated that there are certain shortcomings to brainstorming including *production blocking*. Production blocking describes a condition where some people can not get air time within a creativity session due to simple matters of group interaction. Thompson (2003) identified production blocking as one of the four riders of the apocalypse when it comes to collaborative creativity. She claimed that people forget ideas while they wait for others to present their ideas. Finally, Thompson (2003) argued that it is difficult to both generate and entertain new ideas at the same time. Thus, production is blocked due to this limitation.

They suggested that electronic brainstorming, or "using any procedures that do not require turn taking among group members" (Nijstad & Stroebe, 2006, p. 188). They concluded that the most effective brainstorming is done with small groups, recommending breaking up larger groups if necessary. Thompson (2003) also supported the idea that electronic brainstorming is more productive than traditional verbal brainstorming. In a basic gem of

wisdom, Nijstad and Stroebe (2006) warned that "people should be encouraged to pay attention to one another's ideas because these generally are stimulating" (p. 211). Another benefit of modern technology within American corporate organizations is the abundance of information technologies which can assist in the brainstorming process. Nijstad and Stroebe (2006) suggested "to preserve working memory capacity, external storage of ideas" (p. 211) should be employed. Some examples of such technologies are electronic recording, computerized note taking, electronic white boards, and conference meeting software. Mamykina, Candy, and Edmonds (2002) put another place setting at the same table with the idea that "computing technology has a vast potential to support interdisciplinary creative collaboration" (p. 97). Powers et al. (2006) also noted the power of interdisciplinary teams.

One interesting thing that Pipinich (2006) wisely observed that was missed by all the other researchers is that brainstorming can be an opportunity for creative release when there is no opportunity for such expression in the day to day activities of a routine job. Some "routine jobs do not allow for the self-expression or the satisfaction of creative accomplishment" (Pipinich, 2006, p. 34). He also termed a brainstorming session as a *kaizen event* (Pipinich, 2006, p. 34). Obviously, many routine jobs in the heavily automated modern American economy afford little mental latitude. Organizations would do well to heed Pipinich's (2006) words and hold brainstorming sessions to feel the heartbeat of their members.

Thompson (2003) discussed the merits and pitfalls of brainstorming. Thompson (2003) observed that people can experience anxiety, get caught in production blocking, employ destructive social rituals, and get caged in by conformity during a brainstorming session. She offered several practical suggestions that could enhance brainstorming sessions. Thompson (2003) described the mechanisms as diversifying the team, "creating an organizational memory"

(p. 104), using "trained facilitators" (p. 105), setting "high benchmarks" (p. 105), changing the membership of the brainstorming circle, using "electronic brainstorming" (p. 106), and creating a work playground. Diverse teams will produce different perspectives, entertain more unique viewpoints, and bring novel experiences to the table. "The more heterogeneous a team is, the more likely that the team will excel in all measures of creativity" (Thompson, 2003, p. 102). Thompson (2003) suggested that indexing past ideas and codifying past experiences, and building a history will facilitate future creative efforts. Vera and Crossan (2005) also identified an organizational memory to be important to creativity. Next, Trained facilitators can also improve brainstorming because they "can better follow the rules of brainstorming" (Thompson, 2003, p. 105). Setting high benchmarks entails providing metrics to individuals as a way to give them feedback on their idea generation performance compared to others. Electronic brainstorming uses computer technology to coordinate a brainstorming session. Building a work playground entails creating an area virtual or physical that allows individuals to explore.

Winston Churchill was a talented orator. Perhaps for him the traditional verbal or sentential brainstorming techniques would have been best. Shakespeare was a gifted writer, best suited to brain-writing. Einstein had great powers of visualization. He was tailored to brain-sketching. Vidal, Mulet, Gomes-Senent (2004) described brain-sketching as a visual representation of idea during a collaborative creativity session. Vidal et al. noted that this method follows the same ground rules as brainstorming, including the suspension of judgment, freewheeling, quantity over quality, and combinatorial improvement.

Another form of brainstorming that Vidal et al. (2004) explored was objectual brainstorming. They focused their research on the efficacy of objectual brainstorming and how it fosters collaborative creative production. The "four golden rules for performing a brainstorming

session" (Vidal et al., 2004, p. 287) are still honored. The big difference is that building pieces such as Legos or Meccano are made available to participants to assist in the objectual brainstorming session. Obviously objectual brainstorming lends itself to certain types of problems over others. Vidal et al. admitted that objectual brainstorming is best suited "for design problems of a functional kind" (p. 296). While the authors did not think of the term, perhaps *brain-crafting* would have been a good label for their proposed technique. In a fashion, objectual brainstorming allows a team of people to spontaneously prototype an artifact instantly transforming an idea into practice.

Exploration, experimentation & play

Exploration can enhance creativity through what if scenarios. Play and playfulness encourage creativity through humor, improvisation, and open minded thinking. Davenport and Mazalek (2003) astutely observed that new ideas "require a gestation period in order to gain the momentum required" (p. 21), which entails a period of "experimentation, debate, and the exploration of economic opportunity" (p. 21). This brings up an important aspect of exploration that of integration the old with the new, exploration ways to evolve new structures from existing frameworks. Another important part of exploration is testing, experimentation, feasibility studies, and venture projects. Davenport and Mazalek (2003) deduced that innovation happens in cycles which start with the ability to "imagine an innovation, build a prototype, realize" (p. 30) an application.

Exploration can be seen as a mechanism of divergent thinking trying different things and thinking expansively. Brophy (2006) advocated a *tri-level* theory of creativity. The method uses exploration and divergent thought for "task study, definition, and solution generation" (Brophy, 2006, p. 300) and convergent thinking during "solution judging, choice, and implementation"

(Brophy, 2006, p. 300). Brophy (2006) summarized that "rather than creativity being divergent thought, and problem solving being convergent thought, creativity and problem solving may be better viewed as overlapping domains" (p. 310). Gregerman (2007) proposed that "breakthroughs occur when we leave our comfortable confines and engage the world around us with our sense turned on full blast with a real spirit of curiosity and a readiness to notice and question everything" (p. 10). This sentiment embodies the pioneering spirit of innovation that is necessary to foster exploratory creativity. Gregerman (2007) presented some practical ways that one can explore the world. He suggests reading enthusiastically, "take mini-excursions into the world" (p. 13), "asking stimulating questions" (p. 13), making "friends with unusual people" (p. 13), and expanding your mental horizons. Mamykina, Candy, and Edmonds (2002) and Gregerman were as a lock is to a key. Their complimentary ideas fit together like a glove and hand. They were proponents for "engaging in extensive discussions and what-if sessions" (Mamykina, Candy & Edmonds, 2002, p. 98).

Vera and Crossan (2005) indicated experimentation as an important facilitator of collaborative creativity. They showed that the rule of agree, accept, and add in improvisational performance translated to an experimental culture in modern organizations. This was one of the five principle rules of improvisation. Vera and Crossan (2005) wrote that a modern collaborative creative culture must promote tolerance for mistakes, promote action, and pursue effectiveness over efficiency, and value exploration and innovation. They argued that "the more experimental a team's culture" (Vera & Crossan, 2005, p. 208) the more success they will garner in collaborative, improvisational, creative efforts.

Exploration allows people to see things that others miss. "If you see the world the way everyone else does, you can't create" (Pipinich, 2006, p. 31). Exploration is vital to the

collaborative creative process because it develops new perspectives and encourages insightful observation. He brilliantly penned "if we see problems the same way we have always seen them, we will likely regurgitate the same solutions" (Pipinich, 2006, p. 31). Pipinich (2006) noted that one could examine "any creative product, process, or work of art, and then try to determine how its creator's ability to see differently contributed to its creation" (p. 31). The key is that "the teams were allowed the freedom to experiment" (Pipinich, 2006, p. 31). He also proposed a *value stream map* which is "a visual depiction of complex product and information flow for a given process" (Pipinich, 2006, p. 31).

Nominal Group Technique & Delphi Technique

Thompson (2003) described a powerful thinking mechanism known as the *Nominal group technique*. This technique builds upon brain-writing, which is built upon brainstorming. In brain-writing, participants pause, reflect, and write down their ideas at key moments on paper. This tends to reduce the negative affects of conformity and production blocking. In the Nominal group technique participants evaluate, discuss, examine, and clarify the products of the brain-writing session. The ideas generated from brain-writing are "shared by the group in a round-robin fashion, and summarized" (Thompson, 2003, p. 104). Then the group discusses, evaluates, analyzes, and clarifies the ideas that were created. "Finally, each person rank-orders the ideas" (Thompson, 2003, p. 104). A variation is called the *Delphi Technique* (Thompson, 2003, p. 104). This is basically the Nominal group technique except the participants are widely scattered geographically. Such a technique is useful for collaboration in virtual organizations or virtual classrooms. The method uses "questionnaires followed by feedback" (Thompson, 2003, p. 104). The moderator gives everybody a question to ponder, and asks for responses from everyone. The moderator then gathers responses, collates them, "sends them back out to the team, and solicits

feedback. This process is repeated until the issue" (Thompson, 2003, p. 104) is resolved. Because members are not physically located together, and responses are independent of one another, the problems of conformity and production blocking that attacks typically creativity sessions is eliminated.

Reflective Reframing

Hargadon and Bechky (2006) outlined four mechanisms that collective creativity can be "triggered" (p. 489). Those are help seeking, help giving, reflective reframing, and reinforcing. Help seeking and giving involve activities that cause individuals to give or seek help. Reinforcement strengthens values, beliefs, and positive experiences. Reflective reframing is used when "either people asked the wrong questions or when there were not yet clear questions to ask" (Hargadon & Bechky, 2006, p. 491). The basic mechanism involves "the mindful behaviors of all participants in an interaction, where each respectfully attends to and builds upon the comments and actions of others" (Hargadon & Bechky, 2006, p. 489). Reflective reframing provokes individuals to ask probing question, and "mindfully listening and building on the contributions of the other" (Hargadon & Bechky, 2006, p. 492). Hargadon and Bechky (2006) reported that a vital result is that "one person's suggested framing of the problem shifted others' awareness in ways that made new frames visible" (p. 492). The stimulating reflections of others are meant to trigger new ideas, redirect energies, and prompt memories in others. Hargadon and Bechky (2006) concluded that the resultant flexibility in thinking allows people to link experience with present circumstances which "enabled them to explore a range of interpretations of any given situation and, from this range, collectively consider and pursue possibilities" (p. 493).

Analogical reasoning

Analogy is a powerful mental tool in the tool chest. Thompson (2003) defined *analogic reasoning* as "the act of applying a concept or idea from a particular domain to another domain" (p. 102). *Analogic reasoning* is a useful thinking mechanism that groups can use to collaborate on innovative activities. The basic method is to take an idea from one application and transfer the idea to a new application. For example, the idea of using the nature's mechanism to get burrs to stick to things was transferred to clothing to create Velcro straps. This requires a good understanding of the "deep, or structural, similarity" (Thompson, 2003, p. 102) between things so that they can be transferred from that original domain. The solution to a problem might be within reach of the group. All they need to do is just use analogic reasoning to put the stumbling block in a new context, or view the problem form a different perspective. Often the knowledge to solve the problem is present, "but they fail to access it because it comes from a different context" (Thompson, 2003, p. 102). Thompson (2003) wrote of *the inert knowledge problem*, which is defined as the difficulty of "applying previously learned knowledge to new situations" (p. 103).

Obstacles to collaborative creative thinking

Constraints

One vital aspect about constraints that is not considered by most of the other researchers and theorists is that of predefined projects. It will often be the case the teams are working on projects that are already well defined, it is merely their role to deploy, implement, test, deliver, and support some effort. That is not to say that creativity can't be used in these roles, but rather that often the tasks have some definition which serves to constrict collaborative creativity. Amabile (1983) wrote that constraints hinder group creativity. Along these lines, Powers et al. (2006) cited an example where a "project had a research agenda that was already defined" (p. 5).

This may also mean that *creative rethinking* (Powers et al., 2006, p. 5) is needed in order to adapt to the constraints imposed by predefined agendas, tasks, roles, and responsibilities. "It is not always possible to see project structures and assumptions as mutable" (Powers et al., 2006, p. 8).

Constraints hem in individuals, bottling up their creative effort which causes frustration. Vera and Crossan (2005) concluded that managers can relax constraints in order to foster collaborative creativity. Organizations can learn to develop "minimal constraints within which people are free to experiment and take controlled risks" (Vera & Crossan, 2005, p. 221)

Competition & conflict

Competition, conflict and debate are a source of dissatisfaction in groups. The discordance disrupts harmony and detracts from collaborative creative thinking. Arguments caused from disruptive individuals might be one source of conflict. Task and role conflict can also put up roadblocks in creativity. A conflict of assumptions or internalized beliefs among members of a group can also cause problems to cooperative creativity. Cooper (2005) noted that the formal structures that result from organizational structures sometimes conflict with innovators and innovators needs. Collins (2006) noted that different partners in collaboration might have "different goals, skills and timetables, which can make for difficult relationships" (Cooper, 2005, p. 17).

Kratzer, Leenders, and Engelen (2006) wisely identified three kinds of conflict which includes task conflict, interpersonal conflict, and *team polarity*. Task conflict was defined by Kratzer et al. (2006) as "arising from differences in opinions and perspectives" (p. 96). Interpersonal conflict arises from personality incompatibilities or social conflict. Team polarity arises natural "since the design process itself involves a systematic variation of opinions" (Kratzer et al., 2006, p. 102). While the primary assertion is that conflict obstructs collaborative

creativity, Kratzer et al. (2006) indicated that conflict can be healthy in the generative stages of creativity. Kratzer et al. (2006) vowed that team polarity can help to identify issues, work to bring understanding, "assist in developing new ideas" (p. 97), cause individuals to scrutinize issues, ponder ideas more deeply, and facilitate flexible thinking. Kratzer et al. (2006) insightfully observed that "lower degrees of complexity or in situations later in the development cycle polarity negatively impacts the creative performance" (p. 96) of organizations.

Sometimes there are factors which prevent groups or individuals from collaborating. Chaos, disagreements, and logistical matters can establish roadblocks to integration. Powers et al. (2006) noted that each teams relationships, "project objectives, ideal project time line, and target population, prevented a consolidation of team efforts" (p. 6). Powers et al. (2006) continued that there will be times where the nature of the work or the structure of the organization will lend itself to individualized work rather than collaborative work. Powers et al. (2006) wisely stated that in these cases it might not be wise or effective to force collaboration. Powers et al. (2006) noted that there are times where projects of "individual research rather than exploring collaborative opportunities" (p. 7) is warranted.

Disinterest & dissent

Dissention, distress, apathy, and disinterest cause creativity to breakdown. Another result is social loafing. Fairbank et al. (2003) pointed to sources of disinterest with regard to suggestion systems such as organizations that "do not offer compensation or rewards of any type for participation, submitters do not understand the process through which their suggestions are evaluated, and there are long delays in getting the suggestions processed" (p. 307). Suggestions, of course, are an outlet for creative production within an organization. Furthermore, they noted

that “organizational pressures, inadequate incentives, or strong but incorrect incentives” (Fairbank et al., 2003, p. 307) drain away motivation and creativity.

Disinterest can arise from many different sources. The lack of motivation, conflict, misunderstandings, uninteresting projects, and miscommunication all serve to hinder collaborative creativity. Mamykina, Candy, and Edmonds (2002) pointed to “an ability to communicate and exchange creative ideas is an essential part of the creative process” (p. 97). But what happens when that process breaks down or communication is ineffective? Mamykina, Candy, and Edmonds (2002) took a stab at answering that question by writing “for an interdisciplinary group, this ability can be impaired by the differences in the group members’ professional vocabulary and the concepts they use” (p. 97). These differences which arise from communication barriers can cause disinterest.

Fear & oppression

People become anxious, reluctant, and fearful for a variety of reasons. Moving away from a comfort zone, or fear of criticism are two things which might inhibit productive creativity. Senge (1990) identified that fear and oppression hinders collaboration efforts. Nijstad and Stroebe (2006) cleverly observed that one source of production blocking might be from *evaluation apprehension*, which occurs when people are reluctant to share ideas for fear of criticism. The typical ground rules for a creativity session might include instructions not to be apprehensive, but this is often not something that can easily be commanded. This would be analogous to a legal battle where one side unveils a misbegotten but powerful clue to the case and the judge asks the jury to strike that comment or evidence from the record. But it is difficult to command something away from the human brain. Nijstad and Stroebe (2006) also pointed out

that certain people are naturally shy (p. 187). Likewise reclusive people might be fearful of asserting their ideas for fear of criticism.

Inertia, status quo & tradition

The inertia of norms and the status quo can set up a roadblock to collaborative creative thinking. Functional fixedness can also impede creativity. Fairbank et al. (2003) struck a mighty blow at collaborative creativity by identifying that organizations "for the sake of order and efficiency – develop mechanistic structures and cultures that direct attention to existing work methods and standards" (p. 306) which places heavy emphasis on the status quo thereby discouraging experimentation and creativity.

For every head on a coin there is tail. If the inertia of the status quo represents the head, Pipinich (2006) observed that a management fad represents the tail. In other words, constant turmoil with new initiatives that employees know will be swept away quickly is just as bad as having creativity steamrolled by a resistance to change. People will think that "any new approach is simply a flavor of the month" (Pipinich, 2006, p. 34). Creativity can bring about change, but care must be given not to latch onto the latest fad that won't make a real difference within the organization. Wide berth must be given to those things that "do not add value" (Pipinich, 2006, p. 34), or are laden with "hype and promises of management fads" (Pipinich, 2006, p. 34).

Vera and Crossan (2005) clearly observed that there are good reasons for the preservation of the status quo in certain circumstances. Organizations need to codify and evolve the set of procedures, process, and routines so that past experiences and lessons learned from mistakes can be interwoven into present tasks. "Routines, systems, structure, and strategy" (Vera & Crossan, 2005, p. 220) become institutionalized so that the organization can capitalize on prior learning. However, Vera and Crossan (2005) admitted that this impedes new learning and serves to hinder

creativity. This age old struggle between preservation of the status quo from learned experiences and the shattering of the status quo from new innovations will likely continue to plague mankind.

Insufficient resources & time

All manner of resources from people, time, information, recognition, and financial support need to come together eventually to turn an idea into reality. A lack of resources can constrict collaborative creative thinking within modern corporate American organizations. If groups or key individuals do not share information or pool data other members or groups might be starved of nutritive information necessary to feed new ideas.

When there is insufficient time to perform activities, or when a group is overloaded there is little time left over for productive creative activities. Nijstad and Stroebe (2006) backed up this view by indicating that "the reduced ability to activate knowledge when attention has to be divided among several activities" (p. 211) is one of the major problems with task overloading.

Peer Pressure & conformity

Pressure to conform can cause people to secret away their ideas so as not to tip the apple cart. This, of course, has a negative impact on collaborative creative thinking. Thompson (2003) identified *conformity* to be one of the four deadly diseases that plague collaborative creativity efforts. People wish to be accepted as part of a group. People will go to great lengths to be socially accepted. However when it comes to collaborative creativity you need people who are willing to buck the trend. Peer pressure in the form of conformity propagates "traditional, conservative, and highly similar ideas – exactly the kind of behavior that most organizations would like to avoid" (Thompson, 2003, p. 101). The peer pressure usually arrives in the form of verbal jabbing, criticism, and spoken ridicule. People conform because they are "concerned that others in the group will be critical of their suggestions" (Thompson, 2003, p. 101). Peer pressure

will tend to align rogue ideas that have derailed from the norm. People will feel a tendency to "stay on topic and not present ideas that diverge greatly from those being discussed" (Thompson, 2003, p. 101).

Nijstad and Stroebe (2006) aimed an investigative telescope and magnified two other factors. They stated that *social loafing* and *social matching* are subtle yet powerful mechanisms of peer pressure. In social loafing people tend to let others "do the work because one cannot individually be held accountable" (Nijstad & Stroebe, 2006, p. 188). That is, when it is not apparent which individual contributed what, or there are individual rewards, why should one put forth extra effort? Thompson (2003) also acknowledged that social loafing hinders collaborative creativity. Thompson (2003) added that when loafing occurs when people perceive their "contributions to be unidentifiable and dispensable" (p. 100).

The second mechanism Nijstad and Stroebe (2006) pointed to is *social matching*. This is defined as a situation where high production members tend to slow down in order to match the pace of low production members. In other words, there are social cues, indicators, and pressures to slow down those who are outpacing the rest of the pack. If Stroebe (2006) could be likened to the starring actor, Thompson (2003) played best supporting role. Thompson (2003) termed social matching as *downward norm setting*. However, the two concepts are identical. Typically, there is a trend for "the lowest performers in a group to pull down the average" (Thompson, 2003, p. 101). Thompson (2003) observed that this is particularly true if there is no reward mechanism to encourage the high performers to distinguish themselves.

Poor Management & relationships

Poor feedback and relationships can hinder creativity. For example if people are too concerned with social status the focus can be bleed away from creative efforts. Fairbank et al.

(2003) pointed to the organizational heavens and found a meteoric asteroid hurtling toward its doom. That is organizations are often structured so that they have specific groups that they rely upon for creative output, such as a research & development arm.

Stress & pressure

Stress, tension, and anxiety can detract from creative efforts. It might seem obvious that stress and pressure detracts from creative efforts. Katz et al. (1980) described a host of stress factors that sap the creative energy from collaborative groups. In a similar fashion, Nijstad and Stroebe (2006) pointed to several stress factors that are only present in group situations. These include things such as evaluation apprehension and production blocking.

Unreceptive & close-minded

Often considering the opposite of a notion gives insight into that notion. Gregerman (2007) suggested thinking about the opposite of being close-minded, that of being open-minded. He stated "the greatest skill that any person or organization can possess is a sense of curiosity and possibilities, so stop saying that you are not curious and creative" (p. 13). Clearly keeping a positive, receptive, open-minded attitude will facilitate exploration, and the ability to entertain new ideas which is at the root of collaborative creativity.

It might be the case that a person is unreceptive or close-minded because they are unaware or can not remember an important fact. People who might otherwise be cooperative and helpful might seem to be unreceptive. Indeed, Nijstad and Stroebe (2006) took the ball with this idea and scored a touchdown. They identified the term *collaborative inhibition* (Nijstad & Stroebe, 2006, p. 191) to denote the situation where interactive groups are not able to perform as well as equivalently sized group of individuals, or, so called, *nominal* groups. This is predicated on the idea of a "memory retrieval model to group idea generation" (Nijstad & Stroebe, 2006, p.

191). In other words, ideas are not generate ex nihilo, but are reaped from previously sowed knowledge. They theorize that collaborative inhibition might arise from a "disruption of individual retrieval strategies in a group context" (Nijstad & Stroebe, 2006, p. 191). Nijstad and Stroebe (2006) concluded that there are four things that interfere with retrieval, that of short-term forgetting, *search inertia*, *delay monitoring*, and external cues (p. 200). Search inertia refers to a situation where an individual has some inertia in one direction and is unable to steer away from that course. Delay monitoring refers to situations where people need to learn to "seize the opportunity to express ideas when they occur" (Nijstad & Stroebe, 2006, p. 200).

Conclusion

Collaborative creativity plays a vital role in modern American corporate organizations. The value of original inventive products, process, and inventions drives the modern high technology economy. Corporations should seek to understand, foster, and support collaborative creative efforts. This paper concludes that the dynamics that foster collaborative creativity are autonomy, freedom, control, and choice; challenge and task involvement; climate and culture; collaboration, communication, and synergy; incentives, reward & recognition; flexibility and versatility; goals and values; leadership, empathy and motivation; sufficient resources and time. The paper concludes that the principle thinking mechanisms that facilitate collaborative creativity are assumptions, perspectives and evaluation; brainstorming, brain-writing, and brain-sketching; exploration, experimentation and play; nominal group technique and the Delphi technique; reflective reframing; and analogical reasoning. This paper also identified and concludes that the dynamics that hinder collaborative creativity are constraints; competition and conflict; disinterest and dissent; fear and oppression; inertia, status quo and tradition; insufficient resources and time; peer pressure and conformity; poor management; stress and pressure; and

being unreceptive and close-minded. Note that many of the factors are new or changed from the Breadth component since the contemporary researchers explored new ideas and brought new perspectives to the topic at hand. Creative groups must be given the latitude and opportunity to "produce original, adaptive, and valuable products and processes" (Pipinich, 2006, p. 35) if the modern American corporation is to remain at the forefront of innovation on the global stage.

Depth References

Brophy, D. R. (2006). A Comparison of individual and group efforts to creatively solve contrasting types of problems. *Creativity Research Journal, 18*(3), 293-315. Retrieved October 12, 2007, from the Academic Search Premier database.

Collins, L. (2006). Opening up the innovation process. *IEE Engineering Management, 16*(1), 14-17. Retrieved October 12, 2007, from the Academic Search Premier database.

Cooper, P. (2005). A study of innovators' experience of new product innovation in organizations. *R&D Management, 35*(5), 525-533. Retrieved October 12, 2007, from Business Source Premier database.

Davenport, G., & Mazalek, A. (2004). Dynamics of creativity and technological innovation. *Digital Creativity, 15*(1), 21-31. Retrieved October 12, 2007, from Academic Search Premier database.

Dewett, T. (2003). Understanding the relationship between information technology and creativity in organizations. *Creativity Research Journal, 15*(2 & 3), 167-182. Retrieved October 12, 2007, from Academic Search Premier database.

Fairbank, J. F., Spangler, W. E., Williams, S. D. (2003). Motivating creativity through a computer-mediated employee suggestion management system. *Behavior & information technology, 22*(5), 305-314. Retrieved October 12, 2007, from Academic Search Premier database.

Friedman, T. L. (2005). The world is flat, a brief history of the twenty-first century. New York: Farrar, Straus, and Giroux.

Gregerman, A. (2007). Unlocking genius in yourself and your organization. *Journal for Quality & Participation, 30*(2), 9-13. Retrieved October 12, 2007, from Academic Search Premier database.

Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization Science, 17*(4), 484-500. Retrieved October 12, 2007, from Business Source premier database.

Kratzer, J., Leenders, R. T. A. J., van Engelen, J. M. L. (2006). Team polarity and creative performance in innovation teams. *Creativity & Innovation Management, 15*(1), 96-104. Retrieved October 10, 2007, from Business Source premier database.

Mamykina, L., Candy, L., Edmonds, E. (2002). Collaborative creativity. *Communications of the ACM, 45*(10), 96-99. Retrieved October 12, 2007, from Academic Search Premier database.

Nijstad, B. A., & Stroebe, W. (2006). How the group affects the mind: A cognitive model of idea generation in groups. *Personality & Social Psychology Review, 10*(3), 186-213. Retrieved October 12, 2007, from Academic Search Premier database.

Pipinich, R.E. (2006). High-stakes creativity. *Industrial Engineer, 38*(6), 30-35. Retrieved October 12, 2007, from Academic Search Premier database.

Powers, J., Cumbie, S. A., Weinert C. (2006). Lessons learned through the creative and iterative process of community-based participatory research. *International Journal of Qualitative Methods, 5*(2), 1-9. Retrieved October 12, 2007, from Academic Search Premier database.

Redelinghuys, C., & Bahill, A. T. (2006). A framework for the assessment of the creativity of product design teams. *Journal of Engineering Design, 17*(2), 121-141. Retrieved October 12, 2007, from Academic Search Premier database.

Thompson, L. (2003). Improving the creativity of organizational work groups. *Academy of Management Executive, 17*(1), 96-109. Retrieved October 12, 2007, from Business Source Premier database.

Vera, D., & Crossan, M. (2005). Improvisation and innovative performance in teams. *Organization Science, 16*(3), 203-224. Retrieved October 10, 2007, from Business Source Premier database.

Vidal, R., Mulet, E., Gomez-Senent, E. (2004). Effectiveness of the means of expression in creative problem-solving in design groups. *Journal of Engineering Design, 15*(3), 285-297. Retrieved October 12, 2007, from Academic Search Premier database.

Core Knowledge Area Modules Number 3 Application Essay:

Professional practice for collaborative creative thinking for modern American corporate organizations

Student: Benjamin Cheung

Faculty Mentor: Dr. Teresa Bittner

Faculty Assessor: Dr. Louis Taylor

Walden University

December 9, 2007

Application Component Table of contents

APPLICATION ESSAY

Introduction

This research has delved into the investigation of collaborative creativity within modern corporate American organizations. Creativity shall be used in this paper to mean intellectual inventiveness exhibiting originality, ingenuity, or imagination as applied to a problem, process, response, or concept. The Breadth and Depths components explored and concluded that the dynamics that foster collaborative creativity are autonomy, freedom, control, and choice; challenge and task involvement; climate and culture; collaboration, communication, and synergy; incentives, reward & recognition; flexibility and versatility; goals and values; leadership, empathy and motivation; sufficient resources and time. The principle thinking mechanisms that facilitate collaborative creativity are analogic reasoning, assumptions, perspectives and evaluation; brainstorming, brain-writing, and brain-sketching; exploration, experimentation and play; nominal group technique and the Delphi technique; and reflective reframing. The hindering collaborative creativity dynamics identified were constraints; competition and conflict; disinterest and dissent; fear and oppression; inertia, status quo and tradition; insufficient resources and time; peer pressure and conformity; poor management; stress and pressure; and being unreceptive and close-minded. This paper will develop a seminar that collects the results of the research. The seminar was delivered in a professional setting at Alcatel-Lucent on Wednesday, December 5th, 2007. The assessment of the result from the seminar is performed in a seminar analysis.

Seminar Analysis

Seminar package description

Besides the introduction, and conclusion, the seminar package itself is broken up into three major sections. The first section presents the findings, evaluation, conclusions, and research related to the dynamics that foster collaborative creativity within modern American corporate organizations. The second section detailed the thinking mechanisms that can be employed by groups to engage collaborative creativity. The third section described the work done to evaluate, investigate, and research the factors that hinder collaborative creativity. The introduction section also defines creativity, and described the components of a creative person, generating a creative product within a creative environment through some process. The introduction section also described collected the major points for the investigations and set a basic agenda for the seminar. The conclusion for the seminar wraps up the seminar with the key points for each of the major sections and presents the references.

The images used to represent the dynamics were carefully chosen. A discussion of the selection of the images will also lend further insight into the thought processes that went into designing the seminar. Also it gave visual learners in the audience had a mental hook upon which to hang the new ideas that they are being exposed to. Finally, it is interesting to learn where the images came from.

The Statue of Liberty was taken by me on a trip to visit New York City. The Lady of Liberty often symbolizes freedom and embodies the concepts of choice and autonomy that modern Americans enjoy. The picture for task involvement was a difficult choice. This is a picture of my friend in England, Greg Dart. He is pictured here with his saxaphone. The picture was taken by me using a Contax G1 35mm rangefinder on a tripod with an F 5.6, 1/125 setting

using a multiple image exposure setting. There are, of course, many possible pictures I could have chosen for challenge and task involvement. But playing a saxaphone in a jazz setting requires a love of music, dedication, and concentration. For climate and culture, I chose a picture I took at performance I attended at Carnegie Music Hall. I am fortunate in that I live close to New York City, a hub of culture and performing arts. For collaboration, communication & synergy, I chose a picture of a cellular telephone that I took at a CompUSA store. The cell phone is near and dear to my heart, since I work in the telecommunications field. I also felt that the attendees of the audience would also appreciate and grasp connection between a cellular telephone as a symbol of communication within modern society. For incentives, rewards & recognition I originally thought of using a plaque or trophy that I had received during my life. But, instead, I chose to use a Gold Medal from the 19th Olympic Winter Games located in Salt Lake City, Utah in 2002. The Olympic gold medal is associated by many people with a pinnacle of human physical achievement and the medallion is used as a symbol of that dedication. Flexibility and versatility I choose to use a stock photo of a Swiss army knife, which is mentally associated by many people with the quality or characteristic of being versatile. Goals & values were difficult to embody in a picture, logo, or icon. However, in a moment of inspiration, I chose to use the landing on the moon to represent this concept because it was a long term goal that was accompanied by many inspirational speeches about lofty goal setting. It has also come down through history to be associated with setting goals. This picture was taken by me at the National Air and Space Museum in Washington, DC. Another rather abstract concept to represent was that of Leadership, empathy & motivation. I choose the picture of the United Nations building because of their progressive work in human rights and as a symbol of world leadership. The picture was taken by me from a circle line tour ship during a two hour tour of Manhattan Island. I

choose a picture of an egg timer for sufficient resources and time. This picture of my timer on my couch was taken by me with a Casio Exilim Z-1000 digital camera. Having time to reflect gives people the necessary time for a creative idea to incubate and properly hatch. Assumptions, perspectives & evaluation play an important part of our thinking process. As an abstract concept, perspective was difficult to represent with a picture. The picture is the ceiling of the Basilica di Santa Maria del Fiore church in Florence, Italy. This cathedral church (duomo) is a famous building today. Since the Renaissance gave birth to perspective art embodied in the works of famous artists such as Raphael Sanzio, Leonardo da Vince, and Michelangelo di Lodovico Buonarroti Simoni. The figures in the cupola of the basilica seem to jump out of the two dimensional surface. I took this picture of the duomo during my trip to Italy. Next, the picture of a replica of the Thinker statue was taken by me in New York City. The original was sculpted by Auguste Rodin, now located in Musee Rodin in Paris. I chose this to represent brainstorming, brain-writing, brain sketching, and objectual brainstorming since the Thinker statue has become famous the world over to symbolize thinking and philosophy. For exploration, experimentation and play I chose the robot from the Sony Wonder technology labs in New York City. The robot can imitate lifelike movements and is controlled by a human operator whose voice can be projected through a hidden speaker. The Sony Wonder technology lab is a wonderful exhibit displaying a host of inventions that have sprung from the minds of creative people through exploration, dedication, and ingenuity. Far and away, choosing a picture for the Nominal Group Technique and the Delphi Method was the most difficult thing to represent. I finally ended up choosing a picture from a class that I taught on American Sign Language given at Alcatel-Lucent. For reflective reframing, I wanted to choose a classical photograph which employed a wonderful photographic technique of pool reflections. My mind immediately jumped to my trip to the Taj

Mahal, located in Agra in northern India. This picture of the Taj Mahal was taken from my Contax on a tripod at around 7 A.M. before the site was swarmed by tourists. The reflecting pool in front of the Taj Mahal perfectly reflects a mirror image of the mausoleum. The architectural design of the building is also very mentally appealing because of the repeating patterns that were used in its design. For analogic reasoning I used a picture of the Vitruvian man painted by Leonardo da Vinci. He drew this image to illustrate the proportions of a typical man. But, it has come down through history to symbolize engineering and logical thinking. For the dynamics that hinder collaborative creativity, I chose not to use pictures in order to save space, so that the overall presentation would not be too long. Initially, I had two factors per page. However, as I started to design the slides some of the dynamics had too many important ideas so I ended up splitting a few of them up anyway.

Assumptions

Some of the basic assumptions that went into this research were that there are some basic and important dynamics that serve collaborative creativity. This almost goes without saying, but a host of researchers, philosophers, and theorists have combed the inventive nature of the human mind and succeeded in finding important mechanisms that both hinder and harness collaborative creativity. As research progressed starting from the foundational theorists to the current crop of researchers, the assumption was born out. This was not stated as such during the delivery of the seminar. However, it forms the foundation of the work, and is implicitly interwoven throughout the work.

Another important assumption that underlined the work was that the understanding of human creativity is a worthwhile and important activity to undertake. While a deluge of human activity orbits about useless activities, and many scientific and social inquiries may seem to have

no purposes, the desire for this investigation to look at something of social value. There is probably a desire by most people to engage in something that is worthwhile, lasting, and of significance. In fact, this was identified as one of the important aspects that foster collaborative creativity. The assumption that the study of human creativity can be worthwhile was justified and supported as most of the researchers and many of the theorists took time out of their busy articles to investigate or acknowledge the importance of collaborative creativity to modern American corporate organizations. This was also seeped into the introduction sections of each of the individual components of this paper.

Bias

Most people have some bias when it comes to creativity. They have some preconceived notions of what creativity is and how it operates. People have experienced what it is like to have a creative thought by the time they become an adult. Likewise most people have worked with groups and many people have been involved with larger organizations in their lives. Thus, presenting perspectives developed from the eminent theorists and contemporary researchers offers new insights that can help to dispel some of the preconceived notions that have encrusted the mind.

Bias started with the initial investigation of the focus topic. Before the seminar was conceived, the research had changed the perspective of the author through the findings of the work of the theorists and modern researchers. One of the principle biases was the notion that collaborative creativity was always a positive, progressive, and inspirational process. Hundreds of modern American companies churn out a seemingly endless series of technological marvels that are a testament to human ingenuity. The last 50 years has seen the creation of the personal computer, the internet, cell phones, communication satellites, the jet airlines, and the lunar lander.

The research has shown that there are a variety of subtle dynamics that, in fact, serve to hinder and impede collaborative creativity.

Participant reaction

The overall reaction by the participants was positive. At the end of the seminar, I tossed out a general query to the audience. I asked what they thought of the seminar and the information that was presented. One person commented that the information was very interesting and he wanted to see if he could apply it to his work. In general, I noticed that the most active participants tried to tie the concepts presented to their personal experiences or their present work. This effect was also suggested by Senge (1990) as a mental model that individuals hold as a reality model which serves to filter all incoming information. Thus, it was interesting to see this dynamic in action.

Participant comprehension

Overall, participant comprehension was good. At the beginning of the seminar I did not spend enough time explaining the structure of the talk, so part-way through the factors that support collaborative creativity someone asked how all these things were related to each other. After I went back and explained the three main principle sections of the seminar again they understood the organization. That same person was also late and missed first couple of slides where I laid the ground work for the presentation, the context of the talk, and defined creativity. To their credit, if I had an unlimited amount of slide space I would have designed section dividers which clearly introduced each of the three major parts of the seminar, the dynamics that foster collaborative creativity, techniques, and dynamics that hinder collaborative creativity. There were many good questions posed by the audience, and a number of interactive dialogues that took place. I will only mention some of the more insightful, provocative, and difficult

questions posed by the audience. One question posed by a participant was, “how do I apply these things?” The things referred to the facilitating dynamics, which was the section that the question was posed. Of course, there is no simple answer to this question. I answered the question by deferring it to the thinking mechanisms section of seminar. After I had gone over the thinking mechanisms, I queried that person to see if they had a better understanding of how to put into action those things related to collaborative creativity. They seemed appeased.

After my presentation of the points on collaboration, communication & synergy, there was an interesting discussion over the open model of collaboration versus linear model of collaborative creativity identified by Collins (2006). The person used an example from their own personal past experience about an organization in an Alcatel-Lucent factory located in Columbus, Ohio. His organization pulled people from many different disciplines together in one place and presented the state of affairs for the organization. I responded by stating that a linear model of collaboration is a mentality where people are buried in their own work and then throw their work over the wall to another group. I told him Collins (2006) used the illustrative example where organizations had the mentality that there should be a dedicated research and development group with specific individuals identified to produce creative innovations. Once they generate the ideas they are thrown over the wall to developers, who then take their work and throw it over the wall to manufacturing. I still saw confusion in seminar participant’s face. I poked. He responded by further describing the organizational meeting in Columbus. I queried him to find out more about his meeting, how often it met, who was present, was there interactive dialogue, and was there any collaborative creativity that was allowed to take place. I said that regular cross-functional, interdisciplinary gatherings don’t automatically make the organization adopt an open model of collaborative creativity. If the gathering is just an informational one, where people are receiving

information, then that is not an open model. But, if people are gathered together to be generative, then that is one important step towards adopting an open model of creativity. This discussion was just one of numerous exchanges similar to it. Not all of the participant interactions will be detailed as this would take up too much space.

Another sign of participant comprehension is when their comments reflect that they can connect the point to their own personal experience. Another common form of feedback is a head nod, or facial sign of recognition, or a soft "uh-hmm". One such example is the effect of jargon in the collaboration, communication, and synergy section. This was identified by Mamykina, Candy and Edmonds (2002) as a factor that might influence collaborative creativity. One of the participants had come from a military background before they joined Alcatel-Lucent and apparently the notion that jargon influences communication rang true.

There is another class of perceptions and questions where people ask an insightful question, or they jump the gun. One such example comes from the thinking mechanisms section. When I arrived at the brainstorming part, one participant asked what Brain sketching was. I was only just starting to describe brainstorming and Brain sketching was clearly one of the last elements in the section. The enthusiasm is appreciated, but the timing could have been better on the part of the participant. An example of an insightful question is when someone observed that many of these things in a certain context might also hinder instead of facilitate collaborative creativity. This observation is also supported by the fact that certain dynamics have a counterpart. For example, sufficient resources are listed as a dynamic that facilitates creativity, and lack of resources is listed a dynamic that hinders creativity. Insightful questions on the part of the audience are a strong indicator of comprehension.

Seminar evaluation and assessment

The seminar was both an efficient and effective way to convey information. This is based on interaction with the audience. There are many ways that people learn, of course, and while other ways could have been chosen the work that went into carefully choosing the key points from each of the individual dynamics of collaborative creativity served as an important front line filter to digesting what was the product of a study of hundreds and hundreds of pages of text. While no study was performed, no pre-test, and no post-test administered, an experienced presenter can gauge from perplexed looks, questions asked, and questions posed to the audience if confusion is waging war in the mind of the participants. Some people in the audience might have been shy and probably would not have ventured a question on their own volition. There it is important to either directly ask them a question, or pay attention to facial expressions, and tell tale signs of attention span, curiosity, and attentiveness.

I have given hundreds of presentations during my professional career. I have taught and delivered seminars and presentations at Lucent technologies, Alcatel-Lucent, Comrise technologies, and Farleigh Dickenson University. I regularly give technical presentations on network wireless systems topics and also American Sign Language. If location, location, location is the mantra of a prospective home-owner during house hunting, then preparation, preparation, preparation must be the mantra of a successful seminar or presentation. The better the familiarity with the topic the smoother the presentation will be. Furthermore, the presenter will have a better chance at answering questions that get posed.

Seminar stumbling blocks

Stumbling blocks are points in a seminar where there is a problem of some kind. Typical problems include questions that can't be answered, errors in the text of the seminar, wrong

information that is spoken, insufficient explanations which generate confusion, argumentative participants, and points that were missed. In general, most problems can be grouped into two categories, one category concerns technical problems with the presentation, and the second category deals with problems related to the audience.

I had given quite a bit of attention to carefully preparing the seminar materials. The material had been proof-read multiple times. However, there are still things that fall through the cracks. One example of this is on the Leadership, empathy, and motivation part of the dynamics that foster collaborative creativity. The element in question is the one concerning the nine motivations proposed by Cooper (2005). Cooper (2005) identified nine factors that affect motivation, three of which are related to inventiveness. While this was a minor point, it did cause a participant to take notice and ask for clarification. Notice that on the slides only three factors are listed. There might have been other ways to present the information. For example, instead of writing nine motivations, I could have simply just listed creative buzz, tangible benefit, and excitement instead.

Another example of a technical problem occurred on the sufficient resources and time part of the dynamics that facilitate collaborative creativity section. The element was the five improvisational rules as a way to think about collaborative creativity investigated by Vera and Crossan (2005). Notice that only two out of the five elements are listed. The five improvisational rules that were discussed by Vera and Crossan (2005) were practice; collaboration; agree, accept, and add; be present in the moment; and draw on reincorporation and ready-mades. Within organizations Vera and Crossan (2005) translated these into training (p. 206), collaboration quality (p. 206), experimental culture (p. 207), real time information and communication (p. 208), and organization memory of procedures and systems (p. 209). The reason that not all five were

listed is that in the paper at that element was because the rules were split up into their appropriate sections on collaborative creativity. For example, their rule pertaining to an experimental culture shows up later in the seminar under the exploration, experimentation, and play part of the facilitating dynamics section. This can be readily seen in the slides in the appendix of this paper.

As for the category of participant problems, most of those were pretty minor as well. Luckily, I had no argumentative or disruptive participants in the seminar. The principle stumbling blocks were related to a difficulty in comprehending difficult concepts, or technical terms. For example, the title of Analogic Reasoning proposed by Thompson (2003) was, at first, difficult to understand. But after more explanation describing that it was the use of one idea applied to another area the participant understood. I also used the example of a perfume atomizer which is the central idea of the automobile carburetor as an efficient way to spray gasoline. In retrospect I am not sure that was a great example, but it was the first one that popped into my mind under the pressure of a live delivery of a presentation to a live audience. After I went over the points in the slides there seemed to be comprehension by the audience. Lastly, it should be noted that usually the stumbling blocks related to the participants were experienced by a subset of the audience. I think some of the people got the concepts faster than others. Though it is possible a large majority of the audience also did not understand the concepts and simply kept quiet while other people asked and waited for an answer. However, I base my observations on my scans of the audience looking at their facial and non-verbal cues for understanding and comprehension.

The only other stumbling block related to the participants was a case where the participant wanted to wrestle a concept to the ground. The case in point was related to the open model of collaboration versus the linear model of collaboration proposed by Collins (2006). This

was already discussed previously in the paper. The participant clearly wanted more information, and my descriptions were not helping. What finally addressed the issue was when I probed more about the example he gave concerning the organization in Columbus, Ohio. Even then this was not a major stumbling block, and did not cause any serious problem with the delivery of the presentation. It is the sort of problem that a good presenter looks at as an opportunity to clarify their points and to more fully convey their ideas. The dialogue which ensued was also an opportunity to establish my credibility and knowledge in the subject based on all of the research I had done for this paper.

Finally, a potential stumbling block of all research and presentation of research is validity. How believable research is depends on how well the topic is investigated. The design of experiments and studies also play a vital role in credibility and validity. None of the participants had any issue with the validity of my research. I think the way I structured the information, giving references to each and every element of every part within a section probably helped to establish this credibility. In fact, I carefully chose the best, most well researched elements to support my notions.

Seminar possible improvements

There are many potential improvements that could be made with more effort or a longer seminar. The field of the study of collaborative human creativity within modern corporate American organizations could serve as the foundation of an entire career. Similarly, the seminar could be expanded into various different kinds of packages or varying time lengths. For example, separate sections could have been created for each of the individual dynamics that foster or hinder creativity. Exercises could have been created or studies performed instead of a seminar to test the thinking mechanisms. However, many other contemporary researchers have already

performed these studies. The concept of brain storming is widely known and accepted as a methodical means to coax creative production from collaborative teams. The choice of three sections instead of a new section for each dynamic is defensible since the seminar duration and the KAM objectives and paper length were determined from university guidelines.

Another possible area of improvement might have been an appendix or glossary to the seminar. The interested reader might have been motivated to investigate the technical terms and concepts put forth by the theorists and researchers. However, in retrospect the most difficult points of the seminar were trying to describe and explain terms there were used by to embody concepts or perspectives, such as *metanoia, microworlds,* the Delphi technique*, noetic intelligence, energic inputs*. These were terms, ideas, concepts, and perspectives that are not in everyday regular usage.

Conclusion

The importance of collaborative creativity, ingenuity, originally, and innovative invention plays a crucial part in the success modern American economy. This paper has strived to investigate the important dynamics of collaborative creativity within modern corporate American organizations that serves as the bedrock for human productivity. The investigation started out without any preconceived notions of what specific dynamics characterize collaborative efforts aimed at creative production.

The product of the Breadth and Depth components developed, supports, evaluated, compared, contrasted and concluded notions about the dynamics concerning collaborative creativity. The conclusion that is supported by the theorists and contemporary researchers is that the dynamics that encourage collaborative creativity are autonomy, freedom, control, and choice; challenge and task involvement; climate and culture; collaboration, communication, and synergy;

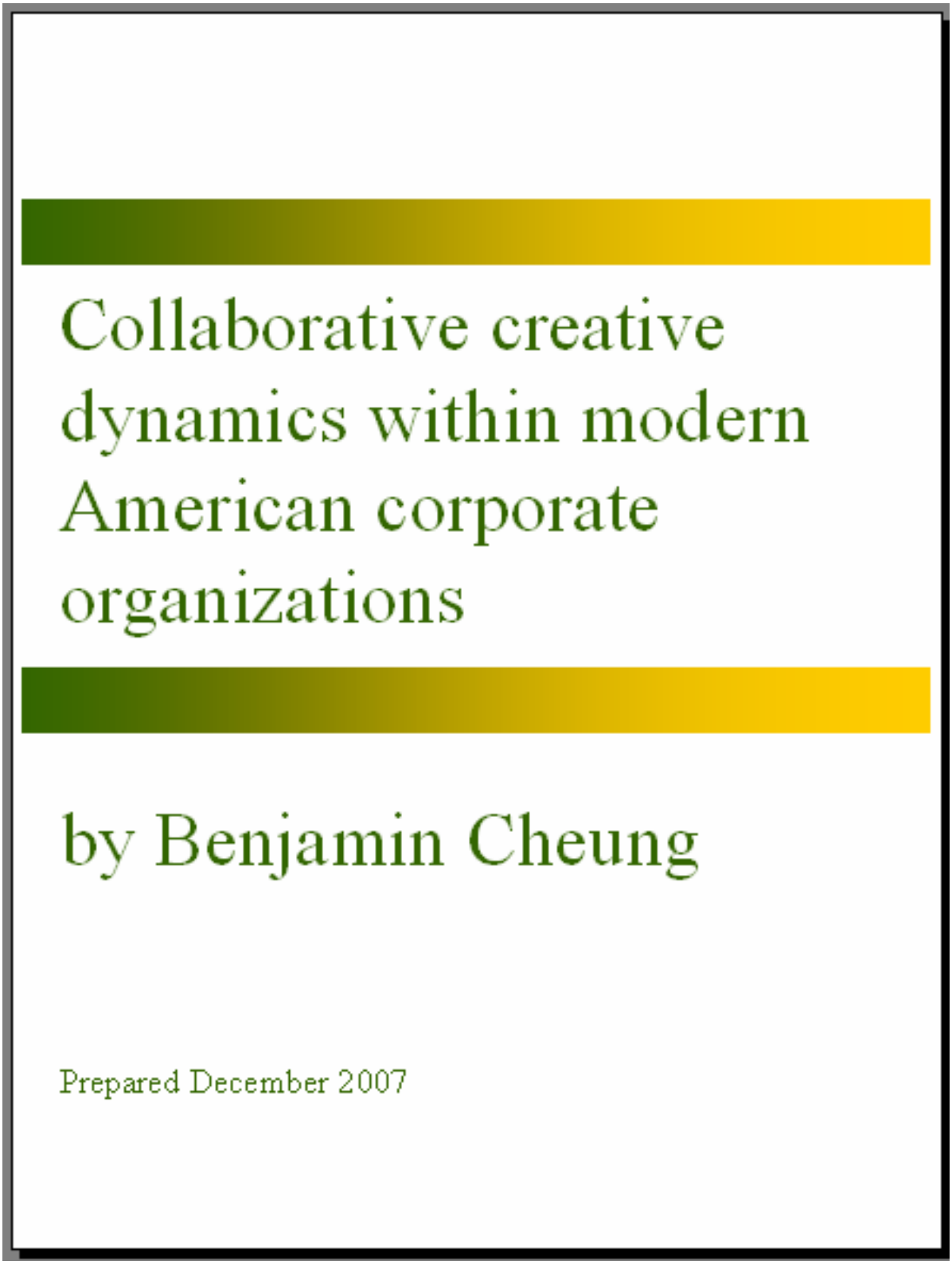
incentives, reward & recognition; flexibility and versatility; goals and values; leadership, empathy and motivation; sufficient resources and time. The important thinking mechanisms that foster collaborative creativity are analogic reasoning; assumptions, perspectives and evaluation; brainstorming, brain-writing, and brain-sketching; exploration, experimentation and play; nominal group technique and the Delphi technique; and reflective reframing. The dynamics that hamper collaborative creativity that were identified were constraints; competition and conflict; disinterest and dissent; fear and oppression; inertia, status quo and tradition; insufficient resources and time; peer pressure and conformity; poor management; stress and pressure; and being unreceptive and close-minded. The investigation of human creativity as it relates to human organizational systems is difficult thing to peer into. However, many pioneering philosophers and theorists including T. M. Amabile, P. M. Senge, and D. Katz, braved the inhospitable mental weather in early attempts at studying collaborative creativity. Today, modern researchers have produced new and interesting insights and perspectives on the understanding of collaborative creativity within modern American corporate organizations.

The Application component strove to put scholarly investigation into professional practice. The knowledge, understanding, and insights gained through the academic work gained the opportunity to become a kinetic reality in the form of a seminar presented to professionals within a modern corporate American organization. The design of the seminar was chosen to optimize the dissemination of perspectives and insights into the key dynamics of collaborative creativity while optimizing the opportunity for interaction with the audience. The seminar was delivered to a live audience on Wednesday, December 5, 2007 to an audience of professionals at Alcatel-Lucent in New Jersey. People were receptive, attentive, and engaged in trying to

understand the main conclusions of the research. The seminar was an efficient and effective means to transform the potential energy of the scholarly work into a kinetic practice.

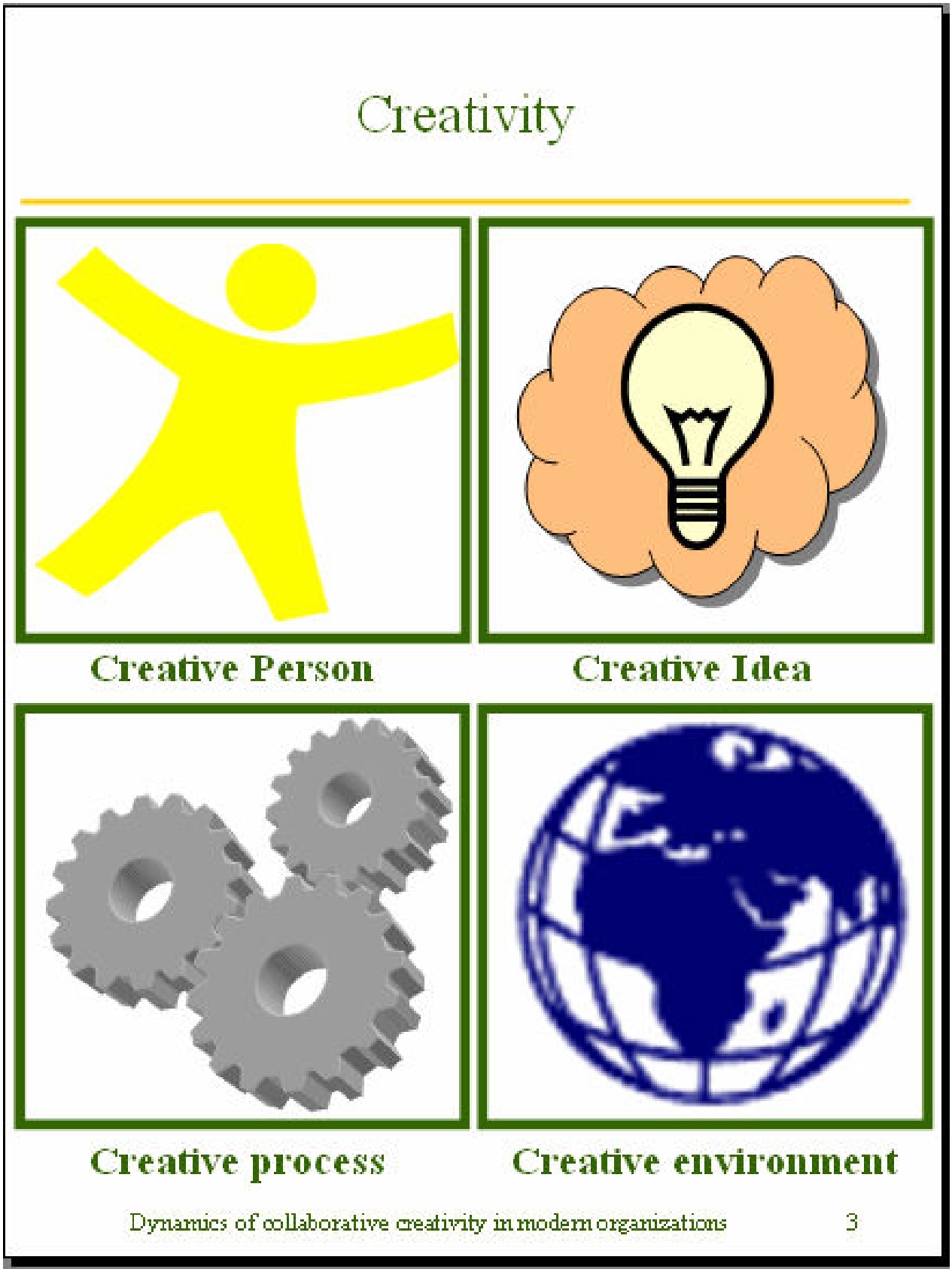
Appendix

Seminar Presentation Package


Collaborative creative dynamics within modern American corporate organizations
by Benjamin Cheung
Prepared December 2007

Definition of Creativity

- "Both a novel and appropriate, useful, correct, or valuable response to the task at hand." (Amabile, et al., 1996, p. 35).
- Divergent production abilities that utilize fluency, originality, elaboration, and mental flexibility. Guilford (1967)
- "The making of a new generalization or invention, or the poetical expression of a new idea" (Wallas, 1920, p. 79).
- Creativity is creative ability; artistic or intellectual inventiveness. Having or showing imagination and artistic or intellectual inventiveness. (The Webster's New World Dictionary of the American Language, 1984).
- Intellectual inventiveness exhibiting originality, ingenuity, or imagination as applied to a problem, process, response, or concept.


Creativity
Creative Person
Creative Idea
Creative process
Creative environment
Dynamics of collaborative creativity in modern organizations
3

Facilitating Dynamics of Collaborative Creativity

- Autonomy, freedom, control, & choice
- Challenge & task involvement
- Climate
- Collaboration, communication, & synergy
- Incentives, reward & recognition
- Flexibility & versatility
- Goals & Values
- Leadership, empathy & motivation
- Sufficient resources & time

Thinking Mechanisms of Collaborative Creativity

- Assumptions, perspectives & evaluation
- Brainstorming, brain-writing, brain-sketching & *objectual* brainstorming
- Exploration, experimentation & play
- Nominal Group Technique & Delphi Technique
- Reflective Reframing
- Analogical reasoning

Hindering Dynamics of Collaborative Creativity

- Constraints
- Competition & conflict
- Disinterest & dissent
- Fear & oppression
- Inertia, status quo & tradition
- Insufficient resources & time
- Peer Pressure & conformity
- Poor Management
- Stress & pressure
- Unreceptive & close-minded

Autonomy, Freedom Control & Choice

- Freedom from external control (Amabile 1983)
- Choice in tasks (Amabile 1983)
- Personal level form autonomy (Katz et al. 1980)
- Group level form autonomy (Katz et al. 1980)
- Job level substance autonomy (Katz et al. 1980)
- Team/department level substance autonomy (Katz et al. 1980)
- Personal Mastery (Senge 1990)
- Differentiation (Katz & Kahn 1966)
- Organic vs. Vertical organization (Senge 1990, Cooper 2005)
- Information technologies (Dewett 2003)
- Isolation & Reflection (Pipinich 2006)

Challenge & Task involvement

- Intriguing problems Amabile (1996)
- Interesting worthwhile tasks (Katz et al. 1980)
- Attitudes & Goals (Brophy 2006)
- High expectancy, high instrumentality, high valence (Fairbank et al. 2003)
- Wonder & curiosity (Gregerman 2007)
- Mindfulness (Hargadon & Bechky 2006)

Climate & Culture

- Stimulating physical environments (Amabile 1996)
- Environment threats (Katz et al. 1980)
- Social structures (Katz & Kuhn 1966)
- Culture of trust, encouragement, exploration (Mamykina, Candy & Edmonds 2002)
- Groups build & *unbuild* together (Powers et al. 2006)
- Investment model (intelligence, knowledge, style, personality, motivation, environment) (Redelinghuys & Bahill 2006)

Collaboration Communication & Synergy

- Dialogue v Discussion (Senge 1990)
- *Noetic* intelligence (Senge 1999)
- *Energic* & informational inputs (Katz et al. 1980)
- Diversity nets (Cooper 2005)
- Jargon (Mamykina, Candy & Edmonds 2002)
- Open model of collaboration vs. linear model (Collins 2006)
- Interdisciplinary teams (Mamykina, Candy & Edmonds 2002)

Incentives Reward & Recognition

- Intrinsic satisfaction (Katz et al. 1980)
- Delivering honest feedback (Senge et al. 1999)
- Extrinsic and intrinsic rewards (Pipinich 2006)
- Higher enjoyment & intrinsic motivation (Amabile 1983)
- Involvement, influence & leadership (Mamykina, Candy & Edmonds, 2002)

Flexibility & Versatility

- *Metanoia* (Senge1990)
- Environmental dynamism (Katz et al. 1980)
- Systems perspectives (System Dynamics, Open, Social, Process, Living systems) (Senge et al. 1999)
- Collective efficacy (Powers et al. 2006)
- Economic Flux (Katz & Kuhn 1966)

Goals & Values

- Shared Vision (Senge 1990)
- Generative learning (Senge 1990)
- Intrinsic v Extrinsic goals (Senge 1990)
- Process v Snapshot thinking (Senge 1990)
- Common interests and needs (Collins 2006)
- Mutual benefit & Complementary Roles (Mamykina, Candy & Edmonds, 2002)

Leadership, Empathy & Motivation

- Intrinsic Motivation (Amabile 1983)
- Mental Models (Senge 1990)
- Alignment (Senge 1990)
- Mechanistic v Organic management system (Katz et al. 1980)
- Socio-emotional leadership vs. Task leadership (Katz & Kuhn 1966)
- 9 motivations (Creative Buzz, tangible benefit, excitement, … Cooper 2005)
- Assistant/Conveyer Model (Mamykina, Candy & Edmonds 2002)

Sufficient Resources & Time

- Sufficient funds (Katz et al. 1980)
- Efficient time management (Senge et al. 1999)
- Reducing nonessential activities, retiring political brinksmanship, combine initiatives, schedule time for focus (Senge et al. 1999)
- Managing resources (Power et al. 2006)
- Resources, Effort, and Value – REV (Redelinghuys & Bahill 2006)
- 5 improvisation rules – Be present in the moment, reincorporation and ready-mades (Vera & Crossan, 2005)

15

Assumptions Perspectives & Evaluation

- State assumptions, investigate premises, share expectations
- Task identification, preparation, response generation, response validation, communication, outcomes (Dewett 2003)
- 3 activities – Creative conceptualization, realization/implementation, Evaluation (Mamykina, Candy & Edmonds 2002)

16

Brainstorming
Brain-writing
Brain-sketching
Objectual Brainstorming

- Brainstorming – don't judge, quantity, combine ideas (Amabile 1996)
- Brain-writing – write down ideas in silence (Brophy 2006)
- Electronic brainstorming (Nijstad & Stroebe 2006)
- Organizational memory, trained facilitators, high benchmarks (Thompson 2003)
- Brain-sketching (Vidal, Mulet, Gomes-Senent 2004)
- *Objectual* brainstorming (Vidal et al. 2004)

Exploration, Experimentation, Play

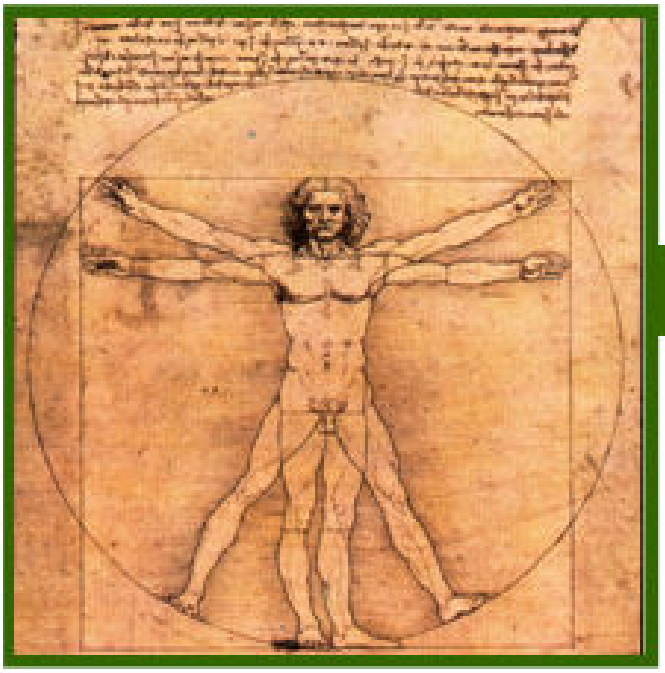
- Play facilitates originality, creativity (Amabile 1996)
- Do the unfamiliar & explore (Senge 1990)
- Risk taking & experimentation (Senge 1990, Vera & Crossan 2005)
- Prototypes (Senge 1990)
- *Microworlds* w/ transitional objects (Senge 1990)
- Tri-level theory (Convergent + Divergent thinking, Brophy 2006)
- Ask, excursions, expand horizons, unusual people (Gregerman 2007)
- Extensive discussions and what-if sessions (Mamykina, Candy & Edmonds 2002)

Nominal Group Technique
The Delphi Method

- Participants evaluate, discuss, examine, clarify products of brain-writing (Thompson 2003)
- Then group discusses, evaluates, analyzes, clarifies ideas (Thompson 2003)
- Delphi Technique – widely scattered geographically questionnaires w/ feedback (Thompson 2003)

Reflective Reframing

- 4 mechanisms – help seeking, help giving, reflective reframing, reinforcing (Hargadon & Bechky 2006)
- Mindful of participants, respectfully attends to and builds on ideas of others (Hargadon & Bechky 2006)
- Reframe the problem & stimulate reflections (Hargadon & Bechky 2006)
- Explore range of interpretations (Hargadon & Bechky 2006)



Analogic Reasoning

- Act of applying a concept or idea from a domain to another domain (Thompson 2003)
- Requires good understanding of deep or structural similarity (Thompson 2003)
- Inert knowledge problem (Taint of previous knowledge, Thompson 2003)
- Use of Analogy

Constraints

- Hinder expansive thinking & exploration (Amabile 1996)
- Misunderstandings, ignorance & complexity (Amabile 1996)
- Detail complexity vs. dynamic complexity (Senge 1990)
- Reinforcing processes (Senge 1990)
- Centralized control illusion (Katz et al. 1980)
- Creative Rethinking (Powers et al 2006)
- Relax Constraints (Vera & Crossan 2005)

Competition & Conflict

- Competition evaluation and win-lose aspect (Amabile 1996)
- Person-role conflict, *intersender* conflict, *intrasender* conflict, overload (Katz et al. 1980)
- Withdrawing, smoothing, compromising, confrontation, forcing, mediation, arbitration, interpersonal process consultation (Katz et al. 1980)
- The Maximization principle (Katz & Kuhn 1966)
- Team polarity (Kratzer, Leenders, Engelen 2006)
- Chaos, disagreements, logistical matters (Powers et al. 2006)
- Individual research vs. collaborative opportunities (Powers et al. 2006)

Disinterest & Dissent

- Perceived apathy (Amabile et al. 1996)
- Trance of mediocrity (Senge 1990)
- Process confusion, long delays (Fairbank et al. 2003)
- Communication breakdown (Mamykina, Candy & Edmonds 2002)

Fear & Oppression

- Enemy is out there syndrome (Senge 1990)
- False appearances, turf, image, break down (Senge 1990)
- Poorly managed centralized control (Katz et al. 1980)
- Miscommunication and distortion (Katz et al. 1980)
- Fear of Criticism , Evaluation apprehension (Nijstad & Stroebe 2006)

Inertia & Status Quo

- Fear of risk (Amabile 1983)
- Learn from experience (Senge 1990)
- Focus on long term (Senge 1990)
- Lack of shared vision (Senge 1990)
- Reality model – mental model (Senge 1990)
- Static world view (Senge 1990)
- Functional fixedness (Fairbank et al. 2003)
- Management fads (Pipinich 2006)
- Codify & institutionalize procedures, routines, systems, processes, structures, routines, & strategies (Vera& Crossan 2005)

Insufficient Resources & Time

- Lack of facilities, equipment, materials, funds, or people (Amabile et al. 1996)
- Realistic time frames (Amabile et al. 1996)
- Fire fighting (Amabile et al. 1996)
- Time to think, pause, reflect (Senge 1990)
- Focus on convergent problems instead of delegating (Senge 1990)
- Allocation of scarce resources (Katz et al. 1980)
- Politics and personal agendas (Katz & Kahn 1966)
- Divided attention & task overload (Nijstad & Stroebe 2006)

Peer Pressure & Conformity

- Conformity pressure (Amabile 1983)
- Perpetuate viewpoints (Amabile 1983)
- Social Loafing (Nijstad & Stroebe 2006)
- Social Matching (Nijstad & Strobe 2006)
- Downward norm setting (Thompson 2003)

Poor Management

- Personality conflicts, political turmoil,
- Unclear objectives (Amabile 1996)
- Poor technical or communication skills (Amabile 1983)
- Team fragmentation (Amabile 1983)
- Tragedy of Commons (Senge 1990)
- Entrenched groups (Senge 1990)
- Over-reliance on designated R&D team (Fairbank et al. 2003)
- Concerned with Social Status (Fairbank et al. 2003)

Stress & Pressure

- Extraneous difficulties (Amabile 1996)
- Effectiveness versus efficiency (Katz et al. 1980)
- Conflict, ambiguity, role conflict, overload, inadequate resources, job dissatisfaction, depression, physiological strain (Katz et al. 1980)
- Evaluation apprehension (Nijstad & Stroebe 2006)
- Production blocking (Nijstad & Stroebe 2006)

Unreceptive & Close-minded

- Political problems, criticism of new ideas, destructive internal competition, avoidance of risk (Amabile et al. 1996)
- *Participative openness* vs. *Reflective openness* (Amabile et al. 1996)
- Non-receptive, negative, close minded, non-exploratory attitude (Gregerman 2007)
- Collaborative inhibition (Nijstad & Stroebe 2006)

Conclusion – Facilitating Dynamics

- Autonomy, freedom, control, & choice
- Challenge & task involvement
- Climate
- Collaboration, communication, & synergy
- Incentives, reward & recognition
- Flexibility & versatility
- Goals & Values
- Leadership, empathy & motivation
- Sufficient resources & time

Conclusion – Thinking Mechanisms

- Assumptions, perspectives & evaluation
- Brainstorming, brain-writing, brain-sketching & objectual brainstorming
- Exploration, experimentation & play
- Nominal Group Technique & Delphi Technique
- Reflective Reframing
- Analogical reasoning

Conclusion – Hindering Dynamics

- Constraints
- Competition & conflict
- Disinterest & dissent
- Fear & oppression
- Inertia, status quo & tradition
- Insufficient resources & time
- Peer Pressure & conformity
- Poor Management
- Stress & pressure
- Unreceptive & close-minded

References

- Amabile, T. M. (1983). *The social psychology of creativity*. New York: Springer Verlag.
- Amabile, T. M., Conti, R., Collins, M. A., Picariello M., Phillips, E., Encio, J., Whitney, D. (1994). *Creativity in context Update to the social psychology of creativity*. Boulder, CO: Westview.
- Katz, D., Kahn, R. L., Adams, J. S. (Ed.). (1980). *The study of organizations*. New York: Jossey-Bass.
- Katz, D., & Kahn, R. L. (1966). *The social psychology of organizations*. New York: John Wiley & Sons.
- Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday.
- Senge, P. M., Kleiner, A., Roberts C., Roth G., Ross, R., Smith, B. (1999). *The dance of change: The challenges to sustaining momentum in learning organizations*. New York: Currency Publications.
- Guralnik D.B. (Ed.). (1984). Webster's New World Dictionary (2nd ed.). New York: Simon and Schuster.
- Guilford, J. P. (1967). The nature of human intelligence. New York: McGraw-Hill Book Company.
- Brophy, D. R. (2006). A Comparison of individual and group efforts to creatively solve contrasting types of problems. *Creativity Research Journal, 18*(3), 293-315. Retrieved October 12, 2007, from the Academic Search Premier database.
- Collins, L. (2006). Opening up the innovation process. *IEE Engineering Management, 16*(1), 14-17. Retrieved October 12, 2007, from the Academic SearchPremier database.
- Cooper, R. (2005). A study of innovators' experience of new product innovation in organizations. *R&D Management, 35*(5), 525-533. Retrieved October 12, 2007, from Business Source Premier database.
- Davenport G., & Mazalek, A. (2004). Dynamics of creativity and technological innovation. *Digital Creativity, 15*(1), 21-31. Retrieved October 12, 2007, from Academic Search Premier database.
- Dewett, T. (2003). Understanding the relationship between information technology and creativity in organizations. *Creativity Research Journal, 15*(2 & 3), 167-182. Retrieved October 12, 2007, from Academic SearchPremier database.
- Fairbank, J. F., Spangler, W. E., Williams, S. D. (2003). Motivating creativity through a computer-mediated employee suggestion management system. *Behavior & information technology, 22*(5), 305-314. Retrieved October 12, 2007, from Academic SearchPremier database.
- Gregerman, A. (2007). Unlocking genius in yourself and your organization. *Journal for Quality & Participation, 30*(2), 9-13. Retrieved October 12, 2007, from Academic Search Premier database.
- Hargadon, A. B., & Bechky, B. A. (2006). When collections of creatives become creative collectives: A field study of problem solving at work. *Organization Science, 17*(4), 484-500. Retrieved October 12, 2007, from Business Source premier database.
- Kratzer, J., Leenders, R. T. A. J., van Engelen, J. M. L. (2006). Team polarity and creative performance in innovation teams. *Creativity & Innovation Management, 15*(1), 96-104. Retrieved October 10, 2007, from Business Source premier database.
- Mamykina, L., Candy, L., Edmonds, E. (2002). Collaborative creativity. *Communications of the ACM, 45*(10), 96-99. Retrieved October 12, 2007, from Academic Search Premier database.
- Nijstad, B. A., & Stroebe, W. (2006). How the group affects the mind: A cognitive model of idea generation in groups. *Personality & Social Psychology Review, 10*(3), 186-213. Retrieved October 12, 2007, from Academic Search Premier database.
- Pignatiello, R.E. (2006). High-stakes creativity. *Industrial Engineer, 38*(6), 30-35. Retrieved October 12, 2007, from Academic Search Premier database.
- Powers, J., Crumbo, S. A., Weinert C. (2006). Lessons learned through the creative and iterative process of community-based participatory research. *International Journal of Qualitative Methods, 5*(2), 1-9. Retrieved October 12, 2007, from Academic SearchPremier database.
- Radcliffe-Taylor, C., & Bahill, A. T. (2006). A frame work for the assessment of the creativity of product design teams. *Journal of Engineering Design, 17*(2), 121-141. Retrieved October 12, 2007, from Academic SearchPremier database.
- Thompson, L. (2003). Improving the creativity of organizational work groups. *Academy of Management Executive, 17*(1), 96-109. Retrieved October 12, 2007, from Business Source Premier database.
- Vera, D., & Crossan, M. (2005). Improvisation and innovative performance in teams. *Organization Science, 16*(3), 203-224. Retrieved October 10, 2007, from Business Source Premier database.
- Vidal, R., Mulet, E., Gomes-Senent, E. (2004). Effectiveness of the means of expression in creative problem-solving in design groups. *Journal of Engineering Design, 15*(3), 285-297. Retrieved October 12, 2007, from Academic Search Premier database.
- Swiss army knife picture Retrieved from Thinkquest.org (n.d.) on November 30, 2007 at http://library.thinkquest.org/04aug01253/Hotspot%20in%20Europe/swiss_army_knife.jpg
- Olympic Gold Medal picture Retrieved from Sportscular Event website on November 30, 2007 at http://sportscularevent.com/past_events.htm

References

No new references were used that were not already noted in the Breadth and Depth components.