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14. ABSTRACT

This special report provides a thorough examination of the question: "How can the Army assess, develop, and retain strategic thinkers?" Expert input from within and outside the military provide a variety of perspectives that highlight areas of convergence and divergence, as well as, exemplar techniques, processes and insights that inform and change the conceptualization and practice of strategic thinking in the military. This compendium does not provide *the answer* to all of the Army's strategic thinking challenges, but it does provide many possible avenues to explore with the goal of enhancing the Army's strategic thinking capabilities.

15. SUBJECT TERMS

strategic thinking, military culture, critical thinking, design, thinking styles

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Chapter Nine

Creativity in Strategic Thinking

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Creativity is a core component in strategic thinking, so it is important to discuss what is known about creativity and how to foster it in order to advance our understanding of strategic thinking. We know a lot about creativity as a phenomenon that occurs in the head of the individual. We know elements of the social-organizational work environment that may be related to creativity. And we know some of the elements of the physical environment that are possibly related to creativity. But we do not know as much about how tools, techniques and materials affect creativity.

We do not know much about everyday creativity because the research has focused on the eminently creative (i.e., sole creative geniuses). And another gap in our current understanding of creativity is in the domain of collective creativity. Collective creativity occurs when all the people in a group contribute simultaneously to a big picture or mental model that emerges from a shared mind and body space. We do know that collective creativity is more than the sum of the parts (i.e., the creative individuals).

All military personnel need to recognize and exercise their individual, everyday creativity in order to be better able to think strategically. Collective creativity relies on creative individuals. Collective creativity opens up opportunities for collective long-term visioning which can inform and inspire strategic thinking as well as bring ownership of the participants to the execution of the strategic plan.

Strategic Thinking is a Creative Activity

The distinction between strategic thinking and strategic planning is well documented in the literature (e.g., Liedtka, 1998). Some of the most succinct distinctions come from leaders in the business management community. Henry Mintzberg (as summarized by Lawrence, 1999) argues that "strategic planning is the systematic programming of pre-identified strategies from which an action plan is developed. Strategic thinking, on the other hand, is a synthesizing process utilizing intuition and creativity whose outcome is an integrated perspective of the enterprise." Hamel and Prahalad (1989) refer to strategic thinking as crafting strategic architecture, while Raimond (1996) refers to strategic thinking as creative imagination. It is clear that creativity is a core component of strategic thinking. So, in these times of rapid change and uncertainty it behooves us to explore what we know and do not know about creativity and how to foster it.

What Do We Know About Creativity and How to Foster It?

We know a lot about the creativity that happens in the head of the individual. Psychologists have been studying this since the 1950's. And there are hundreds of books for the lay reader available

that describe tips and tricks for increasing one's creativity. But the problem is that creativity is not only in the head. We also know that the socio-cultural spaces and environmental places in which creativity occurs are important. There is a body of research that addresses these larger contexts of creativity, but the research only addresses the domain of individual (vs. collective) creativity.

Creativity is not only in the head. Creativity is also in the heart, as it is profoundly affected by emotion (positive emotion is related to increased creativity). So, it is important that the contexts of creativity promote fun and enjoyable experiences. And creativity is in the body as it moves and performs over time. More recent research and applications of it in the front end of innovation are showing that the use of the body can be a medium for creative ideation and expression. And we are just now beginning to realize how important tools and materials can be for sparking the imagination and for externalizing and giving form to ideas.

Beyond individual creativity there is a whole new domain of collective creativity. Far less research has taken place here, although the interest in this domain is quickly gathering speed because the new communication technologies such as social networks are being used to scaffold collective creativity. Tools and materials become particularly important when we are looking at collective creativity.

To more fully answer to the question, *what do we know about creativity and how to foster it,* three types of source materials will be utilized: published literature in peer-reviewed journals, the popular press (both print and online), and personal experience. As will be evident shortly, the published literature on creativity is not sufficiently broad and not always relevant for answering the question. Everyday creativity (i.e., the creativity that people in non-creative careers possess) is a topic that has gained in popularity among the general public over the last ten years. And in the business communities, the interest in creativity from a collaborative perspective (e.g., using terms such as co-creation and crowdsourcing) is growing rapidly (e.g., Surowiecki, 2005). Because of the uneven support from the literature on creativity, I have also found it to be necessary to draw extensively from personal experience as a design research consultant at the front end of innovation.

What Do We Know About Individual Creativity?

The first big wave of creativity research was in the 1950's and early 1960's. Psychologists focused on the creative individual because at the time it was thought that the source of creativity and innovation was the solitary genius. The research at that time was influenced by earlier studies on the creativity of people who have been accomplished, often eminent, creators (e.g., musicians such as Beethoven, painters such as Van Gogh, and scientists such as Einstein). This focus on the elite has helped to fuel the widespread misconception of the lone creative genius. It has also fueled the belief that many people share in thinking that they are not creative. This wave in creativity research died down later in the 1960s. "Like intelligence, creativity was found in highest measure among the people who framed the term. As psychologists eventually recognized, the prototype of the person they described was none other than the psychologists themselves or other intellectuals who were defining creativity" (Cohen-Cole, 2009, p. 245-246).

In the 1970's cognitive psychologists shifted the focus of creativity research to the process of creativity, but it was still only concerned with what went on in the mind of the individual. It was not until the 1990's that the role of collaboration in creativity and innovation began to be seriously explored (Csikszentmihalyi, 1996). Sawyer (2007) does an excellent job of describing this new perspective on creativity and innovation and the impact that it will have on schools, organizations, and industries in the future. Sawyer claims that all true innovation originates in collaboration rather than through the efforts of the solitary genius, supporting this claim with numerous contemporary examples. Sawyer also (2006) makes the case for paying more attention to the variety of manifestations of creativity beyond what has traditionally been celebrated in science and in the high arts. He advocates the study of creativity in jazz, improvisation, and in all forms of visual media, not just the high arts.

Today we have a fair amount of published research that addresses the effects of social and cultural factors on individual creativity. Dul, Ceylan, and Jaspers (2011) conducted a very comprehensive review of empirical studies in management, psychology, engineering, ergonomics and human factors, architecture and indoor design journals. They summarized the elements of the social-organizational work environment that are possibly related to creativity. These elements include challenging job, teamwork, task rotation, autonomy in job, coaching supervisor, time for thinking, creative goals, recognition of creative ideas, and incentives for creative results.

Dul et al. (2011) also summarized findings of numerous studies looking at the effects of environmental factors on individual creativity. They list the following as elements of the physical work environment that are possibly related to creativity: furniture, indoor plants/flowers, calming colors, inspiring colors, privacy, window view to nature, any window view, quantity of light, daylight, indoor (physical) climate, positive sound, and positive smell.

Contexts of Creativity: A Framework

Contexts of Creativity is a framework that was developed in practice to serve as a means of organizing what we know about creativity in order to help clients learn how to facilitate the creativity of others. It is not another theory about creativity. We have plenty of those. It is big picture that holds and organizes what it is that we know about creativity for the purpose of applying it in practice. Figure 1 shows individual creativity as three layers of context around the head of an individual. It shows that individual creativity is not only in the head, but in the heart as well: it involves emotion. And creativity takes place in the body. It is evoked through activity and motion. There is a timeframe for creativity. Creativity can be enhanced through preparation and with the passage of time. And the last layer shows that creativity is in the environment, i.e., it is influenced by the places and spaces and through the props and materials that are available for use.
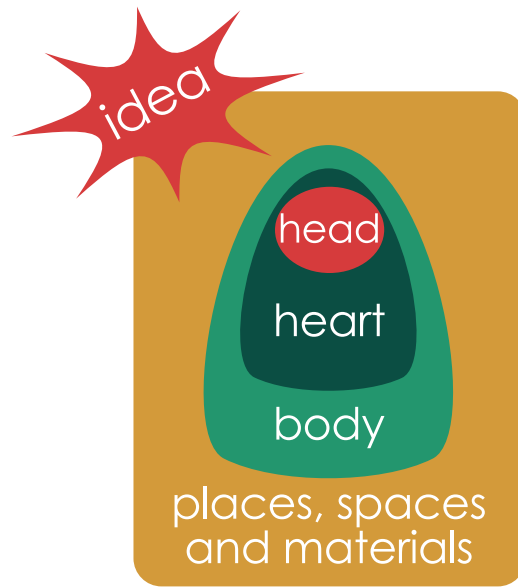
Figure 1. Contexts of Creativity: A framework for individual creativity.

The Contexts of Creativity framework expands into a framework for collective creativity that will be described later (see Figures 2 and 3).

Creativity and Cognition

At the core of the framework for individual creativity is the idea in the head. Ideas are the basic building blocks of creativity. Creative thinking often works by having people make new connections between previously unconnected ideas. Ideas connect to other ideas in two ways: through either association or bisociation. Association links similar or related ideas. Koestler (1964) introduced the concept of bisociation where two apparently unconnected ideas are brought together, and a new connection is explored. Koestler hypothesized that bisociation is the basic creative act and that this act is the same for art, science, and humor. Koestler claimed that every creative act involves bisociation, a process that brings together and combines previously unrelated ideas. Koestler's evidence for bisociation came from a common pattern of intersecting conceptual planes of thought that he has described with many examples showing creative achievements in the arts, sciences, and humor. Other variations on Koeslter's hypothesis about bisociation have been proposed more recently. For example, Michalko (2011) explains the creative act as conceptual blending.

Creativity and Emotion

The second layer in the framework for individual creativity looks beyond the head to the heart, i.e., to one's emotional state and its role in creative thinking and doing. For many years, cognitive psychologists studied the mind while doing their best to ignore the effect of emotions because emotional states were harder to control and to quantify than were cognitive events. But

more recent psychological research has shown that cognition and emotion cannot be separated. In fact, emotion drives cognition, which is shown in the framework by positioning the head within the larger context of the heart. Our emotional states influence not only how we feel but also on how we think and act, including our ability to be creative. For example, the link between creativity and positive affect (i.e., emotion) was firmly supported in a meta-analysis of 66 studies about creativity and affect (Baas et al. 2008). In addition, Isen's (1999) work shows that:

- Positive emotion increases the number of ideas available for association and/or bisociation,

- Positive emotion increase the breadth of ideas that are relevant to the problem, and

- Positive emotion increases cognitive flexibility, making it more likely that the ideas will connect.

Creativity in Motion

The third layer in the framework for individual creativity looks at the whole person in action. Here the head and the heart are in the body that is moving through space and time. The implications of this layer for creativity are immense and are just now beginning to be explored, particularly in interactive design domains.

It is important to keep in mind that creativity takes time and that it is not an instantaneous event. In 1926, Graham Wallas introduced what may be the very first model of the creative process. He identified five stages in the process:

1. *Preparation*: preparatory work that focuses the individual's mind on the problem),

2. *Incubation*: where the problem is internalized into the unconscious mind and nothing appears externally to be happening),

3. *Intimation*: the creative person gets a "feeling" that a solution is on its way),

4. *Illumination*: where the creative idea bursts forth into conscious awareness); and

5. *Verification*: where the idea is consciously verified, elaborated, and then applied).

Design involves imagining and creating new life situations for people in circumstances that have never been experienced before. "Design is an inquiry into the future situation of use" (Gedenryd, 1998, p.158). By experiencing new or possible situations in a bodily way, (e.g., Burns, Dishman Johnson, & Verplank, 1995; Diaz, Reunanen, & Salmi, 2009; Suri & Buchenau, 2000; Oulasvirta, Kurvinen, & Kankainen, 2003; Simsarian, 2003), things may become apparent that were not evident under abstract consideration alone. Enacting refers to the use of the body in the environment to express and experience ideas about future use situations. The implications for movement and bodily action as a context for design and creative visioning are just now beginning to be explored (e.g., Jungmann, 2011).

Creativity in the Environment Including Spaces, Places, and Materials

The fourth layer in the framework for individual creativity is described by the environment in which the action is taking place. This layer includes the physical environment with its places and spaces as well as all the stuff in the environment such as materials, supplies, props, and tools. The design of physical environments that facilitate creativity is a relatively new area of architecture and interior space design practice, but one that is being aggressively pursued today by progressive architecture firms and workplace furniture manufacturers (e.g., http://360.steelcase.com/articles/distributed-collaboration-works-future-in-view/).

Beyond the academic literature, there are many books, websites and blogs that are filled with tools, tricks, and techniques for improving one's individual creativity. For example, *A Whack on the Side of the Head* (von Oech, 2008) offers tips and tricks while *Orbiting the Giant Hairball* (MacKenzie, 1996) is more of an inspirational book. And www.lifehacker.com is a good web resource.

How Can Individual Creativity Be Fostered?

Drawing from all three types of source materials (e.g., the academic literature, popular press and practical experience), the following is a summary of what is important in fostering and stimulating individual creativity across socio-cultural, physical, and material spaces (see Table 1).

The Teledyne Brown Engineering Project

A short review of a project in design ergonomics will help to elucidate factors in the space of tools, techniques, and materials with an emphasis on tools, techniques and materials for making future artifacts and enacting future scenarios of use (Sanders, 1992). The first part of the case focuses on individual creativity. The implications of the case for collective creativity will be discussed later.

Figure 2. On the left, Sergeant Coker considers changing the location of several user interface controls within the context of a full-size cab mockup covered in Velcro. The photo in the middle shows that the meeting with Sergeant Coker took place with all the project stakeholders standing around the Velcro-model. On the right is the final appearance model of the redesigned cab.

Table 1

Fostering and Stimulating Individual Creativity Across Socio-Cultural, Physical, and Material Spaces

Individual Creativity in the Socio-Cultural Space
Expertise in the domain
Permission to be creative
Preparation (and incubation) for being creative
Motivation for finding and/or solving the problem
Being in a positive state of mind
Trust in the people who are also a part of the socio-cultural space
Time for the creative process to take place
Flexibility in process and deliverables
Acknowledgement of one's own creativity
Recognition for the creative idea
Incentives for creative results
Individual Creativity in the Physical Space
Views, particularly a view to nature
Light, particularly natural light
Plants and other natural materials
Sensory stimuli (e.g., color, sound, music, smell, breeze, etc.)
Furniture to support a variety of postures
Walls on which to post visual and verbal stimuli
Enough space for activity and motion to take place
Privacy
Permission to make a mess
Control over environmental factors (e.g., personalization , temperature, etc.)
Individual Creativity in the Space of Tools, Techniques, and Materials
Ambiguity
Abundance
Incompleteness
Serendipity
Unexpected events and surprises
Changes in course
Constraints in the process
Changes in the boundary of the problem space
The internet
Sources for personal inspiration (e.g. www.pinterest.com)
Tools for capturing, collecting and storing data, information, images, ideas, and insights
Tools, techniques and materials for *making* future artifacts (e.g., paper collages, LEGOs, clay, Velcro-modeling, etc.)
Tools and techniques for *telling* future stories (e.g., "paper spaces", storytelling, etc.)
Tools, techniques and materials for *enacting* future scenarios of use (e.g., props used in improvisation)
And of course, white boards, walls and sticky notes

I led a team of designers and ergonomists who were charged with a very complex systems problem that gave very little opportunity for learning about the system. The task was to configure the layout of all user interface components in the operator's cab of a large military loader. This involved the placement of over 150 distinct dials, switches, indicators, buttons, and lights. About 40 of the controls were new to the industry which meant there were no precedents from which to learn. It was clear that the problem could not be solved in the one and half days for fieldwork (i.e., observations and interviews) that had been budgeted, but the project timeline and scope had already been agreed to. In addition, the project took place in 1990 during the Gulf War, making it very difficult to get much useful information during the fieldwork phase due to heightened security at the Air Force Base.

Out of the confluence of factors (e.g., a lack of clarity in systems understanding, inadequate time for field research, a tight budget and an impending meeting with the client team from Teledyne Brown Engineering) a new design research method was invented. We created a Velcro-model, a full-sized, three-dimensional model of the loader's cab with moveable walls, windows, seat, steering wheel, control panels, etc. Every user-interface component was color-coded by system and backed with Velcro so it could be quickly repositioned at will on any surface. Even the overall configuration of the cab could be changed instantly, revealing interdependencies between the major physical parts such as the seat, console, windows, foot controls, and door. With this full scale rough prototype, we discovered internal discrepancies in the MIL-STD 1492 Human Factors Guidelines and were able to initiate the change process for that.

Once the components were positioned in the Velcro-model by the design team members to the best of their ability, the preliminary solution was presented to the development engineers from TBE. They refined the solution in about two hours by sitting in the cab and discussing the repositioning of components based on more thorough understandings of the system, the new controls and the various tasks that the loader needed to support. The refined layout was to be presented in the afternoon to the Officer whose job it was to provide feedback on the design solution as a representative of all military end-users. He did not need a presentation. The Officer immediately sat down in the cab and began to test and to tweak the controls layout. He was able to very quickly refine the layout of all the user-interface components based on his many years of experience operating similar vehicles. He then commented, "This is fun! I feel like a kid in a candy store! No one ever asked me for my input before the design was made!"

The Officer's experience in individual creativity can be characterized by many of the factors listed above as contributors to individual creativity such as: domain expertise, permission to be creative, motivation for solving the problem, being in positive state of mind, etc. In addition, the ambiguity and flexibility of the 150 Velcro-backed user interface components served as a very powerful toolkit for letting him quickly try out many ideas relating to the layout of the user interface controls. The full-scale physical cab environment also facilitated his enactment of future use scenarios. Iteratively throughout the entire session, he would make a change and then test it by pretending (with his whole body) to run through typical as well as challenging tasks that the operators were likely to encounter in the operations of the Air Force loader. He also came up with some new functions/components that were later added to the design solution. The case demonstrates that creativity is not just in the head but in the social environment, the

physical environment and especially in the tools and materials that are made available to support creativity.

What Do We Know About Collective Creativity?

Creative teams are made up of a diversity of people. There is evidence that team creativity is founded on diversity and difference (Nijstad & DeDrue, 2002). In other words, the more diverse the members of the team, the more creative they have the potential to become. The primary advantage of collective creativity is that people with many different ways of thinking and decision making can be brought together, increasing the chances that connections and new insights will occur at many levels. But at the same time, with all these people having different perspectives, it may be hard for them to come to agreement. This is where the physical environment as well as tools, technology, and materials can help to foster creativity.
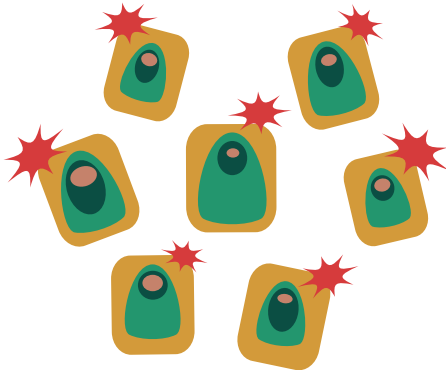

Figure 3. Brainstorming   *Figure 4.* Collective creativity

The Contexts of Creativity framework explodes in scope and scale when we think about people coming together in creative ways. When people come together, the number and breadth of associations and bisociations that are brought to the table increases dramatically. There are at least two patterns in what happens when people come together for creative activities: brainstorming and collective creativity.

Brainstorming usually looks like the diagram in Figure 3 that shows a group of somewhat different people, each one relying on their individual creativity to come up with thoughts or ideas that get scribbled on a post-it note or written on the white board. When it is going especially well, thoughts from one person can trigger additional thoughts in other people. So you end up with a lot of thoughts and ideas. But there is usually no big picture that connects the ideas. And there may not be a shared mental model of what was just created.

Collective creativity looks like the diagram in Figure 4 that shows a group of very diverse people connected in thought and action and working together as one on a very big idea or set of connected ideas. Collective creativity has the potential to produce very powerful results when the conditions are right. Collective creativity uses all of the contexts of creativity (heart, body, space, tools, and materials) to support and scaffold the shared space of thoughts and ideas. When collective creativity is working well, all the people in the group contribute simultaneously to a big picture or mental model that emerges from the shared mind and body space. Bissola and Imperatori (2011) are in the early stages of comparing individual and collective creativity. They report that group creativity is more than the sum of individual creative skills.

The co-construction of a visualization of the big picture or shared mental model is essential for collective creativity and this is where the importance of the tools and materials comes into play. The photo in Figure 5 shows a shared mental model of individual creativity that was made by a transdisciplinary team of graduate students taking a seminar in *Individual and Collective Creativity*. The mind is the radial shape in the middle and the two circles below it are different modes of everyday creativity. The idea is the blue shape in the lower right. Everything else refers to various contextual factors that influence creativity. For example, the *splat!* refers to the use of external memory devices that are used to capture, collect and organize data, information, images, ideas, and insights.
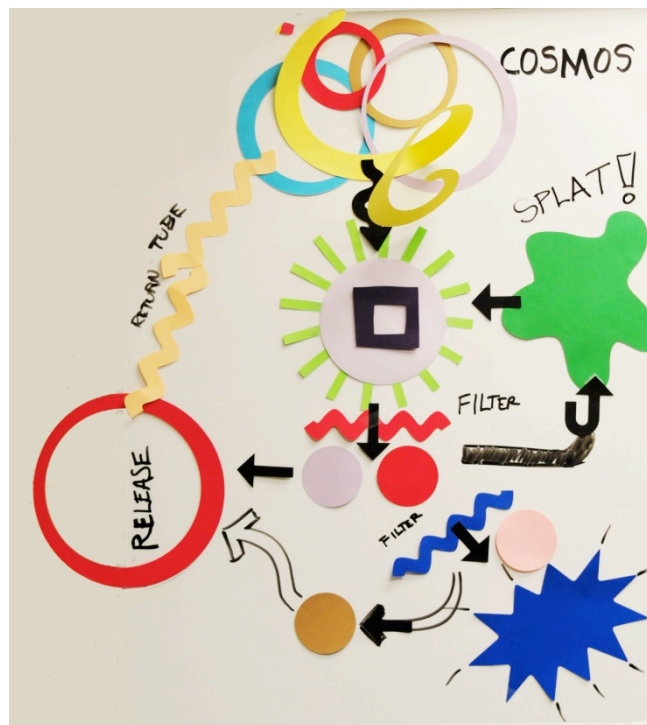
Figure 5. A collective model of individual creativity

There is not much published research on the socio-cultural context of collective creativity, but a few contributions from people representing a wide range of disciplines have recently emerged. Fischer (2011) uses the term social creativity to describe the social spaces of collective creativity. He proposes that "to bring social creativity alive, *cultures of participation* need to be fostered and supported with socio-technical environments in which all stakeholders are able to

express themselves, combine different perspectives and generate new understandings" (Fisher, 2011, p.1). He describes six technology application environments to support his proposition. Parjanen, Harmaakorpi, and Frantsi (2010, p.1) asked, "how it is possible to span the structural holes in cross-disciplined multi-actor innovation?" They conclude, on the basis of a case study in practice, that brokers (both process and session brokers) are needed to exploit the distances that are caused by the structural holes. Sawyer (2006) discusses performance creativity using examples from the performance of jazz and improvisation. It is interesting to note that his expertise in performance creativity comes from practice in the early years of his career.

There are also some recent papers dealing with the physical spaces of collective creativity. For example, Fruchter and Bosch-Sijtsema (2011) discovered that a large wall/physical display surface facilitated dynamic participation in a collaborative work environment. They concluded that "the wall acts as a mediator for individual reflection-in-action and team reflection-in-interaction. It serves as social glue both between individuals and between geographically distributed subgroups" (p. 221). Pang (2010) describes the construction and use of what he calls "paper spaces" based on his experiences in organizing and participating in over 100 future workshops. Paper spaces consist of large sheets of paper and sticky notes covering the walls of a meeting room. Paper spaces allow people to move ideas (written on the sticky notes) around and "turn thinking about the future into a shared experience in constructing a common view of the future" (Pang, p.9). Ivey and Sanders (2006) described the use of a physical environment that was designed to promote creative co-experience. The space was characterized by six themes: by nature, activity/motion, visual characteristics, social interaction, time/privacy, and sound present or absent in their surrounding.

In the space of tools, techniques, and materials, Sanders, Brandt, and Binder (2010) describe a framework of generative tools for making, telling, and enacting. The tools for making, for example, are designed to support and provoke creative thinking. The *make toolkits* contain a collection of ambiguous (and unambiguous) elements such as images and words that people use for making visualizations in the form of collages or maps that describe their dreams for future experience. The *make tools* are used in visioning sessions to explore future scenarios of use. Generative tools can be used with individuals or with groups of people and they work equally well with everyday people and with professionals.

The same types of tools and materials (for making, telling, and enacting) can be used for collective creativity and for individual creativity but the scale and the quantity need to be increased for use in group settings. The short case on the Velcro-modeling of the military loader cab is a good example of this. As a tool for collective creativity, the Velcro-model (see the photos in Figure 2) allowed all the stakeholders to participate directly and simultaneously in the placement and juxtaposition of every single user-interface component. Velcro-modeling was successful not only from a product system point of view but also from the people point of view. It served as a common ground for communication and understanding for all the stakeholders. It helped in the construction of a shared mind and body space. It is important to keep in mind that the stakeholders in this case had different types and levels of expertise relevant to the loader design, including: mechanical engineering, systems engineering, electrical engineering, industrial design, ergonomics, user research, and biomechanics.

Interest in collective forms of creativity is growing and is of particular interest in the corporate landscape. For example, LEGO Serious Play (www.legoseriousplay.com) is "an innovative, experiential process designed to enhance innovation and business performance" that uses special sets of LEGO building blocks. And www.neuland-world.com sells materials to support and facilitate the visualization of collective sessions. There is a very useful web resource called *Welcome to the Pattern Language for Group Process* (www.grouppatternlanguage.org) that addresses collective creativity. This is a wiki for exploring and documenting "what makes deliberative group conversations more fulfilling and inspiring, more effective and more whole". It is a remarkable set of 91 patterns that describe the social spaces that are needed for collective creativity and visioning. It also addresses the physical spaces and techniques to some degree. Being a collaborative wiki that is structured as a Pattern Language (Alexander et al., 1977), it is an embodiment of collective creativity in its own right. It appears that the contributors are active practitioners of group processes.

How Can Collective Creativity Be Fostered?

Drawing from all three types of source materials (e.g., the academic literature, popular press and practical experience), the following is a summary of what is important in fostering and stimulating collective creativity across socio-cultural, physical and material spaces. Please note that everything that is important for the individual also matters for the collective in fostering and stimulating creativity. See Table 2 for additional factors unique to the collective situation.

How Is Collective Creativity Used In Strategic Thinking?

We can see examples of collective creativity being used for strategic thinking in practice. Here the practices are more likely to be referred to as long-term visioning. Long-term visioning refers to a large and growing set of methods and techniques for exploring and planning for the future. These methods have been selected based on diversity in origin, purpose and approach and they are listed in chronological order based on the first available publication. These methods all use collective creativity for strategic thinking but they vary along other dimensions.

Future Workshops (Jungk & Mullert, 1987)

The Future Workshop was developed for use with citizen groups having limited resources who wanted a say in the decision making process. The process steps through the common problematic situation, to the generation of visions about the future, and then to a discussion of how these visions can be realized. The future workshop is particularly suitable for people who have little experience with processes of creative decision making.

Table 2
Additional Factors Unique to the Collective Situation

Collective Creativity in the Socio-Cultural Space
Diversity of participants
Trust among the participants
Mutual respect between participants
Sense of ownership in the collective vision
No executive control
Breakdowns (e.g., Schon, 1983) that offer opportunities for reflection and learning
Participants who have good social skills
Principles of interaction
Group methods with facilitation
Support for a wide variety of behaviors including quiet reflection, relaxation, active collaboration, making a mess, etc.
Support for a range of moods including playful, serious, stimulating, informal, formal, etc.
Collective Creativity in the Physical Space
Walls where materials can be posted for all to see and act upon
Round tables
Furniture that can be easily rearranged
Support for both individuals and groups of varying size working face-to-face
Comfortable and dedicated spaces of collaboration, for retreat, for fun, etc.
Enough space for collaborative physical construction of prototypes and artifacts
Enough space to support collaborative enactments
Collective Creativity in the Space Of Tools, Techniques, and Materials
Access to shared content
A common language to support a shared mind and body space
Collaborative visualization capabilities
Physical construction via prototypes (full scale is best)

Scenario Planning (e.g., Schwartz, 1991)

As the Global Business Network relays,

> The purpose of scenario thinking is not to identify the most likely future, but to create a map of uncertainty — to acknowledge and examine the visible and hidden forces that are driving us toward the unknown future. Scenarios are created and used in sets of multiple stories that capture a range of possibilities, good and bad, expected and surprising. They are designed to stretch our thinking about emerging changes and the opportunities and threats that the future might hold. They allow us to weigh our choices more carefully when making short-term and long-term strategic decisions. (http://www.gbn.com/about/scenario_planning.php)

Open Space (Owen, 1997a, 1997b)

"Open Space Technology (OST) is an approach for hosting meetings, conferences, corporate-style retreats and community summit events, focused on a specific theme and important purpose or task – but *beginning* without any formal agenda, beyond the overall purpose or theme" (www.openspaceworld.org). OST is best suited for conditions of complexity and urgency where a diversity of people are needed to make any solution work.

World Café (Brown, Isaacs, & The World Café Community, 2005)

The World Café website states,

> Drawing on seven integrated design principles, the World Café methodology is a simple, effective, and flexible format for hosting large group dialogue. Team members create new points of view through dialogue and discussion. They pool their information and examine it from various angles. Eventually, they integrate their diverse individual perspectives into a new collective perspective. (www.theworldcafe.com)

The Art of Hosting

The Art of Hosting website relays, "Hosting is an emerging set of practices for facilitating group conversations of all sizes, supported by principles that maximize collective intelligence, welcome and listen to diverse viewpoints, maximize participation and civility, and transform conflict into creative cooperation" (www.artofhosting.org).

A quick comparative analysis of these methods reveals a set of dimensions on which the long-term visioning methods can be described and compared.

- *Participants*: The people involved in the collaborative sessions range from domain experts (e.g., Scenario Planning) to everyday people (e.g., Future Workshop). The diversity of people put together for these sessions has been increasing over time.

- *Physical spaces and places*: Some methods, such as World Café, put a lot of emphasis and specificity on the physical environmental qualities of the place where the visioning activities take place, whereas others place less emphasis here.

- *Social attitudes, activities and rules for engagement*: Some methods, such as Open Space and the Art of Hosting, place a lot of emphasis on describing the principles that are needed to support and enable the collaborative session; others do not.

- *Tools, techniques and materials*: Some methods, such as World Café, specify the tools, techniques, and materials that are needed to support and/or facilitate the visioning activities. Others do not describe specific materials to be used, although sticky notes do appear to be ubiquitous. The specificity of tools, techniques, and materials is another area that is growing rapidly.

- *Follow-through*: Some methods, such as Scenario Planning and Future Workshop, explicitly address the decision-making stage that follows the visioning stage, whereas others do not.

Collective creativity in strategic thinking (i.e. collective strategic thinking) will lead to support for and ownership of the ideas and strategies by the people who were involved in their creation. I have seen this pattern manifest itself in the design of new hospitals. Nurses and physicians who were involved as co-creators in the design of a new hospital were able to better handle the transition from the old to the new hospital. This is normally a very difficult type of organizational transformation because new practices must be learned in order for the staff to work in the new hospital. However, when the nurses, physicians, and other staff are involved in co-creating the new hospital, they feel as if they own it and that it was their idea. The situation goes from one of fear of change to excitement for the challenge of the move.

Fostering Individual Creativity

Day-to-day decisions have the potential to be addressed via strategic thinking to the extent that everyone becomes more of a strategic thinker who is capable of exercising his/her creativity. Furthermore, in order to foster collective creativity in strategic thinking, we need creative individuals (i.e., people who believe they are creative). The challenge is that many people believe they are not creative. This perception comes from a variety of sources. One such source is the myth that true creativity is possessed only by the creative genius. Another source is the current state of the educational system where creativity is not encouraged. In the command and control culture of the military, the expression of creativity is also not a way of life. On the other hand, the attitude about personal everyday creativity is changing across generations. A quick review of socio-cultural and marketplace trends shows that members of Generation Y (those born in the 1980's and early 1990's) expect to be engaged creatively, and they do not hesitate to act on opportunities to become co-creators of their own futures.

For people to contribute to collective creative sessions, the first step is for them to acknowledge that they are creative. The framework for everyday creativity can help to lower the barrier for people to conceive of themselves as creative individuals and it can provide stepping stones to a variety of modes of creativity.

The framework of everyday creativity describes four modes of creativity: *doing*, *making*, *adapting*, and *creating* (Sanders, 2005). It was developed based on many years of experience conducting fieldwork using participatory design with everyday people (i.e., people who are not trained in design and are likely to think that they are not creative). We often asked people to take photos of their daily activities and then tell us about them. We asked which activities made them feel creative. A surprising and reoccurring finding was that people expressed an incredibly wide range of activities that made them feel creative.
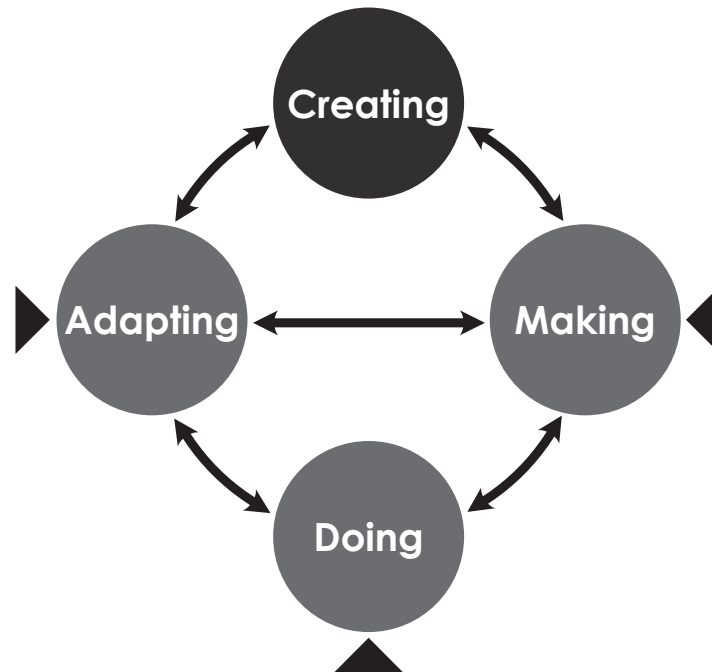
Figure 6. A framework for everyday creativity

The framework for everyday creativity outlines four broad modes of creativity that people recognize in their lives.

Doing is motivated by productivity. It is about getting something done. For example, some people say they feel creative when cleaning and reorganizing their closets. Doing requires a minimal level of expertise and interest in the domain.

Adapting is motivated by the need people have to make things their own. Adapting happens when people change something to make it meet their unique needs or to better fit their personality. For example, many people adapt their car interiors to better suit their needs or personalities. Adapting requires a greater level of expertise and interest in the domain than does doing.

The Culin Hedgerow Cutter is an example of creativity manifested in adapting. According to the story, in 1944 at age 29, Sergeant Culin devised a modification to go on the front of the Sherman tank to drive right through hedgerows without making the tank vulnerable. This was crucial for getting past the Germans in the hedgerow landscape in the Normandy section of France. Culin's invention is at the level of adapting. This is not the most developed mode of creativity, but certainly was an idea that was both ingenious and useful.

Figure 7. The Culin Hedgerow Cutter is an example of the adapting mode of creativity

Making is motivated by people's needs to make things with their own hands. Making generally involves the use of a pattern, recipe, or kit. For example, cooking while following a recipe or building a deck with a plan would be considered examples of making. Making requires a fairly high degree of expertise and interest in the domain.

Creating is motivated by people's needs to express themselves in truly open and creative ways. Creating is generally accomplished without a pattern, recipe, or kit. For example, composing a song or inventing a new game would be everyday examples of creating. Creating requires the highest levels of expertise and passion in the domain.

Most people live simultaneously at all levels of creativity. For example, they may be in the *creating* mode when it comes to cooking, but *doing* when it comes to the use of their car. It is important to keep in mind that all four modes describe creative activities because their execution makes people feel creative. The model is visualized as an action cycle because its purpose is to provide actionable direction for nurturing creativity in all modes. As the pointers indicate, it is possible to get started on the action cycle by either doing, adapting or making. It is also possible to move from mode to mode as the double-headed arrows show. The only path that is not possible is a direct path from doing to creating. The move from doing to creating must be mediated by the other modes of creativity and may take a number of years of experience to accomplish.

People can readily describe their everyday activities in terms of the four modes in the action cycle. Meyers (2010) asked people to write on cards the activities from their everyday lives that they feel creative in doing. Then she asked them to categorize the activity cards into the four modes of doing, adapting, making, and creating. Everyone was able to position the cards in the four creativity modes. They were very interested in the arrangements of their own cards and could easily talk about how they might expand their range of creative activities in the future.

We can use the action cycle of everyday creativity to help people recognize where and how their creativity is being expressed at home and then apply that way of thinking and being to their work. The process can be done either with individuals or in a small group setting. Doing it in a group setting brings the advantage that people become aware that patterns of creativity differ

between people. And the group discussions that take place are usually quite useful and sometimes therapeutic. It is a three-step process that first takes place with regard to the activities they engage in at home.

The first step is to introduce the participants to the model of everyday creativity and share with them the different modes of creativity. This informs them that creativity is multifaceted and usually brings with it the realization that they are, in fact, a creative person. The second step is to engage them in the card sorting exercise described above. Ask them to write on cards descriptions of how they spend their time at home and then sort the cards into the four modes of creativity: doing, adapting, making, and creating. Ask them to comment on the results of the card sorting. For example: How and where is their everyday creativity manifested? Do they consider themselves to be operating in the creative mode in any domain? Which activities bring them the most pleasure and/or satisfaction? The third step is to ask them to describe how they would change the arrangement of activity cards in the future. Are there certain modes of activity that they desire more of? Are there modes that they have too much of? How could they extend the range of their creative activities by trying out different modes?

After they have had the opportunity to discover their pattern of everyday creativity at home, invite them to repeat this exercise with a focus on the tasks, activities, and experiences that make up their workdays. Then ask them to compare the home and the work versions. Do they exhibit more creativity at home or at work? How can they apply the creativity that happens at home to their activities on the job?

The framework for everyday creativity helps people realize that creativity manifests itself in many different ways, and it shows up in different patterns across people. It shows them their own modes and patterns of creativity, as well as, reveals opportunities for alternative modes of creativity within the domains that they already have mastered. The first step to increasing one's creativity on the job is the realization that they are a creative person in everyday living. The next step is to recognize and act on opportunities for trying out other modes of everyday creativity. To the extent that everyone recognizes that they are creative, we will have the potential for far more powerful collective creativity.

Conclusion

In summary, by exploring the current state of creativity research and practice, gaps in our understanding of creativity were exposed. The gaps in knowledge can be seen primarily in the domains of everyday creativity and in collective creativity. In terms of the spaces of creativity, we know more about the social than the physical spaces, and the space of tools, techniques, and materials is particularly underdeveloped. However, it is also clear that interest in the gap areas is growing and that the interest is coming both from everyday people and from the business community.

As our understanding of creativity moves from the individual to the collective, it brings with it the potential to embrace the diversity of people who are needed to tackle the wicked problems that we face in the future. With participation of all those whose lives are at stake, collective

action is more likely to bring about sustainable transformations in the ways that we live, work, and learn.

In these troubled, uncertain times, we don't need more command and control; we need better means to engage everyone's intelligence in solving challenges and crises as they arise. (Wheatley, 2005)

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