**CHAPTER 7**

# A SURVEY OF CREATIVITY IN COMPLEX MILITARY SYSTEMS[1]

*Matthew Furtado[2]*

> *We need to entertain every prospect of novelty, every chance that could result in new combinations, and subject them to the most impartial scrutiny. For the probability is that nine hundred and ninety-nine of them will come to nothing, either because they are worthless in themselves or because we shall not know how to elicit their value; but we had better entertain them all, however skeptically, for the thousandth idea may be the one that will change the world.*
>
> Alfred North Whitehead,
> *Dialogues of Alfred North Whitehead*, 2001[3]

There is no standard definition for the phenomenon of creativity. The creativity research field is varied, with contributions from such diverse fields as cognitive science, psychology, systems science, and the visual and applied arts. There are two primary attributes common to most modern definitions of creativity: the concepts of novelty and value in use. Noticeably absent in military doctrine and literature is a comprehensive discussion of a theory of creativity.

The United States Army clearly values the phenomenon. Creativity is present in doctrine, which defines operational art as 'the cognitive approach by commanders and staffs—supported by their skill, knowledge, experience, *creativity*, and judgment—to develop strategies, campaigns, and operations to organise and employ military forces by integrating ends, ways, and means'.[4] The Army's most comprehensive doctrinal discussion of creativity occurs in its publication series devoted to mission command. Army Doctrinal Reference Publication (ADRP) 6-0 devotes one subparagraph to creativity. In it, it states the value of adopting novel approaches to operations assuming enemy forces have studied US forces' previous actions. It further states that creativity drives adaptation, the process of adjusting previous approaches to apply to a current problem, as well as innovation, the process of developing new approaches to a particular problem.[5]

The Army's doctrinal treatment of creativity leaves some confusion as to the relationship between creativity, innovation, adaptation and agility. In fact, the term most often appears in conjunction with another term, such as innovation or critical thought. Its treatment leaves readers certain that creativity is valuable but does not indicate ways in which to operationalise it or exploit it, short of making it the responsibility of a commander. Also absent from doctrine or military literature is a discussion of how creativity may influence military perspectives differently. For example, does creativity perform the same role in strategic thought as it does in operational or tactical thought? Furthermore, how do different planning methodologies and organisational structures associated with them affect the potential to employ creativity?

This confusion is exacerbated in the operational Army by exposure to predominantly tactical-level formations that employ the Military Decision-Making Process (MDMP). This methodology operationalises critical thinking into a process designed to produce viable solutions to relatively well-defined tactical problems. Absent is a concerted effort to employ a complementary thinking process that leverages imagination and visualisation to generate new ideas rather than adapt existing concepts into viable solutions. In short, through training and experience most officers are moulded to be critical at the expense of being creative.

A better understanding of creativity will address this organisational imbalance. It will allow leaders and planners to make better decisions concerning how they will employ the operations process and conduct planning. For commanders who drive the operations process, a deeper understanding of creativity will allow them to assess how their organisational leadership skills and command environment either promote or inhibit creative thought. It will also allow them to be more deliberate with their planning guidance and problem-solving framework. For planners and staff, a deeper understanding of creativity will sharpen the distinction between criticality and creativity, facilitating more purposeful use of each set of cognitive skills. In short, understanding creativity will help the Army move to a more deliberate process of adaptation or innovation.

Any concept of military creativity must address how the phenomenon influences thinking and planning differently from the strategic, operational and tactical perspective. This indicates that creativity is variable depending on both the echelon of the organisation and the planning methodology it employs. Creativity from the tactical perspective focuses on problem-solving and is limited to adaptive behaviours due to the prescriptive nature of doctrine. Creativity from the operational and strategic perspective focuses on both problem finding and learning. For these perspectives, organisational structure, process and individual attributes drive creative outcomes. These are different in function and logic and necessary to each other in the practice of strategic and operational design. A systems-definition of military creativity will help illustrate these concepts.

## A systems definition of military creativity

The broadest definition applicable to a military context found in reviewing creativity research literature defines creativity as ‘the interplay between ability and process by which an individual or group produces an outcome or product that is both novel and useful as defined within some social context’.[6] To adapt the above to a specific military context, this chapter proposes that military creativity is the interplay between expertise and organisational process by which military personnel or organisations produce outcomes or products that are novel and useful in achieving some form of purposeful relative advantage. This definition distinguishes creativity by expertise, process, and the military context in which actions occur.

The sections that follow will evaluate creativity from various military perspectives to discern how each of the elements from this section influence the nature, value and purpose of creative outcomes. This chapter argues that the unique ecological structure of military operations from the tactical, operational, and strategic perspective will yield differing opportunities for creative outcomes in both propensity and use.

## Creativity and strategy

The proposed systems-definition of creativity illustrates the propensity and nature of creativity in the strategic context. There are numerous definitions of military strategy; most of them in some manner define strategy as the alignment of ends and means in pursuit of political objectives.[7] Put simply, the function of strategy, rather than its process, provides a better definition for evaluating other concepts as they relate to strategy. Therefore, for the purposes of this chapter, strategy is the logic and actions that guide military efforts to gain or maintain perpetual advantage. This definition provides a basis to illustrate the importance of creativity in the context of strategy. Creativity demands novel ideation to generate theories of advantage and action in executing strategic thought. These theories provide the foundation for developing novel artefacts that guide action and influence the ecology of strategy.

Strategy relies on creative potential to both perceive the strategic environment and develop a guiding logic to act within it. It follows that a strategist must first develop a theory of the environment, both its current state and future possibilities, before considering how to generate some form of advantage. This process requires two specific types of theorising: descriptive and normative. The ability to perceive and describe accurately the environment and rivals will influence the creative space that will guide subordinate action. Broadly, originality, flexibility and fluency characterise novel ideation.[8] Those skilled in divergent thinking will produce ideas that stress one or more of the characteristics above and lead to higher probabilities of creative outcomes. The value of divergent thinking is evident in thinking about the strategic environment itself. Divergent thinking allows a strategist to more accurately perceive the environment, develop original theories to explain why it is so, and challenge cognitive bias that distorts thought.

Lateral thinking, a specific form of applied divergent thinking, influences how readily a planner can avoid the influence of patterned thought. Recall that humans access knowledge stores in response to information before deciding whether to apply a previously-developed solution or generating a new idea to govern action.[9] This knowledge access process relies on thought structures called schemas to organise and interpret information observed in the environment.[10] Humans are prone to either ignoring contradictory information that fails to conform to the dominant schema or subconsciously fabricating missing details in order to match the schema pattern.[11] Those skilled in lateral thinking are conscious of this potential for bias and deliberately look for different ways to reinterpret their observations.[12] Individuals can also use disciplined critical thinking tools to identify and account for biased thought.[13] Such individuals expand the space for critical and creative thought by ensuring accuracy of perception.

This is particularly important since such perception influences the foundation of a theory of advantage that guides strategic thought. It is important to note that such a theory must account for both the environment and a rival. Such thinking demands second-order understanding of a rival, which accounts for the rival's understanding of the environment and its influence on its strategic logic and capabilities.[14] It is clear that strategists must develop new ideas to account for the contextual nuance of the environment when developing a strategic estimate. These ideas will influence how strategists define, assess, and ultimately seek to influence advantage. Only original thinking can conceptualise the foundational theory of advantage that should guide strategic action. History provides an example of the value of lateral thinking and second-order understanding in strategy.

T. E. Lawrence demonstrated the power of lateral thinking in perceiving strategic advantage during the Arab Revolt. Following the Arab seizure of Wejh, Lawrence paused to consider the strategic environment. Prussian-influenced Western convention indicated the next logical step for the Arabs would be to attack the Turks concentrated in Medina. This conformed to Clausewitz's idea that war was a duel between forces seeking to overthrow each other.[15] In this manner, armies became the objectives of operations aimed at their destruction. However, Lawrence perceived new insight into the Arab position by considering the environment from the Turkish perspective, a critical first step in developing second-order understanding. This led him to see the unique advantage the Arabs possessed due to circumstances. First, the Turks were compelled to secure their lines-of-communication (LOCs), especially the railway, to maintain their modern force. This created an insurmountable math problem for the Turks since they lacked the manpower required to guarantee their LOCs over such distances. This forced them to become sedentary, a position exacerbated over time by their need to consume their horses to compensate for disruptions to their supply lines, further eroding their mobility and thus their ability to contest rebel influence.[16]

This dynamic created the dilemma that Lawrence perceived as advantageous. Rather than rivals, he conceptualised armies as 'plants, immobile, firm-rooted, nourished through long stems to the head'.[17] Here is evidence of how affordance is both objective and subjective in generating meaning. The physical disposition of the Turkish force generated a specific insight to Lawrence, as the observer, but only because he was able to alter his interpretation of the nature of a modern army. This demonstrates the integrated nature of cognition and how 'affordance points both ways, to the environment and to the observer. This new knowledge results from novel perception and ideation, both creative acts that result from the expertise and thinking abilities of the individual strategist'.[18] However, strategists still require a theory of action to exploit this novel insight.

In addition to novel insight about the environment, divergent thinking influences the development of theories of action to achieve or maintain strategic advantage. Two things become evident in following this logic. First, any logic of action must be novel due to the contextually-dependent theory of the environment it is to influence. Lawrence again provides an example of novel ideation in how he envisioned the Arabs capable of exploiting the advantage described earlier. To exploit the immobility of the Turks, Lawrence advocated that the Arabs attack their materiel and lines of communications. In his words, the Arabs should fight a 'war of detachment' in which '[t]he death of a Turkish bridge or rail, machine or gun or charge of high explosive, was more profitable to us than the death of a Turk'.[19] This kind of war exploited the detrimental tension the Turks faced in sustaining a modern military on an extended logistical tether. Their mass forced them to safeguard their LOCs, which in turn made them more sedentary and less capable of imposing their preferred kind of war on the Arabs.

In addition to requiring a novel theory to guide action, the temporal nature of the strategic environment is indefinite and thus requires perpetual reframing to account for change. Complexity theorists would describe this dynamic as a complex adaptive system in which all actors seek a superior fit within the competitive environment.[20] This indicates that as rivals put their strategies in action, relationships will change the environment and potentially alter the original guiding theory of the environment. Thus, the goal of strategy is not to simply achieve advantage; it is to maintain perpetual advantage in light of changes induced by rivals or the environment itself.

This explains why strategic advantage equates to degrees of freedom in action. An actor with a greater capacity to induce or react to change has a competitive edge in the evolutionary context of conflict. This results from their ability to create more variation or to perceive more aptly which variations will be advantageous in the changing environment. Two prominent strategic theories illustrate how creativity and the ability to induce novelty is at the heart of strategy.

Ancient Chinese strategy seeks to exploit superior adaptability to the potential created by *shi*, or environmental disposition, relative to a rival. Rather than focus on actions, Chinese strategy focused on the set-up and efficacy of a complex adaptive system.[21] This provides an advantage for the actor who can better adjust and manipulate the structure of the environment to employ *shi*.[22] This corroborates modern theories that focus on the structure of competition as a lever to create and exploit strategic advantage.[23] This theory seeks to shape the environment to gain certainty of victory should a rival choose to fight rather than accept defeat. Thus, adaptation to the environment is what denotes superior strategy in the mind of ancient Chinese strategists. While theories on efficacy seek advantage through outright superior adaptation to circumstances, other theories seek advantage by limiting a rival's ability to understand the environment and cope with change.

John Boyd developed a theory that equates strategy to purposeful actions that deny a rival the ability to adapt to change. His theory rests on an ability to secure an advantage early and prevent a rival from recovering and compensating.[24] Actors do so by continuously introducing novelty within the environment, adding both energy and complexity to the system. Over time, variation compounds and prevents the rival from accurately perceiving or understanding the environment. This prevents a rival from acting with cohesive logic due to the mismatch between their perception of the environment and the reality being enacted by the actor.[25] In short, the two theories above demonstrate the central role that creativity plays in strategic thought. Both equate advantage with a superior ability to create and exploit variation within the strategic environment. The novel ideas guiding those variations along with guiding strategic logic are creative outcomes. Strategy also has a dialectic influence on the forces that shape the strategic environment.

In summary, creativity is central to strategy. Strategists seek to gain and maintain perpetual advantage. Strategists develop novel theories to describe and guide action within a competitive environment to account for the contextually-unique circumstances. This environment favours the actor who can introduce more influential, purposeful variation into the system, thus inducing advantageous change. This difference yields learning for the actor creating the change while potentially inducing shock on a rival. Actors maintain coherence when their actions are congruent with their strategic logic and environment. An inability to perceive and adapt to change will limit freedom of action over time, ceding advantage to a rival. In short, the creative process itself, tempered with judgment, is what yields strategic advantage.

## Creativity and operational art

Operational art has both a theoretical and doctrinal foundation that influences the nature and manifestation of creativity. In general, theory defines operational art as 'the grey area between strategy and tactics, operational art spans the theory and practice of planning and conducting campaigns and major operations aimed at accomplishing strategic and operational objectives in a given theatre of operations'.[26]

Similarly, Army doctrine defines operational art as ‘the pursuit of strategic objectives, in whole or in part, through the arrangement of tactical actions in time, space, and purpose’.[27] Both definitions indicate that operational art is an intermediate process that uses synthesis to translate the logic of strategy into an operational form that employs the functions and capabilities of tactics. The purpose of operational art, its constituent processes, and the unique ecology of operations creates opportunities for creativity related to theorising and developing novel operational approaches.

Foremost, the contextually-dependent nature of operational planning ensures all operational approaches are novel. This is evident when one considers the difference between tactics and operations. From the tactical perspective, friendly forces and rivals have intersubjective understanding as both understand their rival and environment through similar contexts of tactics. Both seek to impose a specific outcome relative to their rival or the environment and both understand those effects in the same light.[28] In contrast, planners use operational art to develop an approach that reconciles the guiding logic of strategy with the influences of a rival’s actions. Since rivals are subject to different strategic guidance, one cannot assume that rivals hold intersubjective understanding as each rival may view himself, the environment, and the meaning of their interactions differently. Thus, the purpose of operational art is to develop a unique approach congruent with the logic of strategy relative to an understanding of a rival. In short, operational art demands the continuous development of contextually-dependent, novel theories capable of directing practical action. Operational art still requires a process to put form to those theories and guide purposeful action.

As discussed above, operational art is closely associated with ambiguous, difficult problem sets due to the unique nature of synthesising strategic logic into a contested environment. This interaction creates complex, ill-defined problems, indicating that operational art demands a conceptual approach to planning. Design processes are one method of conceptualising ill-structured problems.[29] As a process, design promotes creativity throughout its conduct and in its resultant artefacts.

Foremost, the design process requires developing both descriptive and prescriptive theories, both of which require novel idea generation in the context of operational art. The Army’s design process, Army Design Methodology (ADM), corresponds to the theoretical treatment of design as a method of inquiry focused on seeing oneself in the environment, envisioning a desired future state, and developing a way to bring about the desired change of states.[30] Environmental and problem framing equate to developing theories that describe the environment. Thus, theorising is synonymous with idea-generation.

Furthermore, these ideas must be novel to account for the contextual nuance of the complex interaction between oneself, a rival, and the environment. This contextual distinction further prevents planners from using a ‘search’ methodology, available to tactical planners, for solving the operational problem. Tactical planners can select, from an existing array of tactical tasks, the appropriate combination of effects to achieve their mission. In contrast, operational artists develop approaches that use more conceptual tools to communicate requirements. In short, operational artists create new knowledge when using ADM as a sense-making and conceptual planning tool. While the steps of ADM will always yield novel insight and approaches when used for operational planning, how planners conduct those steps also contributes to creativity.

The non-prescriptive and collaborative nature of ADM extends the pool of expert knowledge and promotes divergent thinking, both critical elements in determining creative outcomes. Army design doctrine advocates that planners conduct framing activities collaboratively.[31] It follows that this alone extends the pool of expert knowledge available to planners; however, this collaboration, combined with the loose guidelines outlining design steps, creates more opportunities to apply that knowledge creatively. Recall that in tactical planning, there is pressure for planners to only look at a problem through the lens of their particular warfighter function for the purpose of creating a predefined deliverable. In design, doctrine is less prescriptive about what those deliverables are, demanding only that the presentation products include both a narrative and a graphic.[32]

This type of collaboration allows planners to abandon their specific functional expertise and engage other knowledge stores and experiences during framing activities. This impacts the propensity for creativity in two important ways. First, this framing-focused collaboration reduces the 'norming' pressure that would exist if a team member could claim expert knowledge.[33] Second, this plurality of views creates tension between ideas that can lead to new knowledge (also a creative outcome) when the group explores the rationale behind the divergent views to reconcile the differences.[34] Collaboration is the medium that coordinates the distributed knowledge and experience of a design team; however, knowledge alone does not guarantee a novel outcome. It is how an individual perceives the environment and uses knowledge that contributes to creative outcomes. This illustrates the earlier discussion of divergent thinking techniques.

Divergent thinking contributes to creative outcomes during design by enabling individuals to minimise and mitigate thought-constraining bias and more accurately interpret information. Framing is synonymous with perceiving the environment and theorising why it is so. Lateral thinking confers the same benefits to operational artists as to strategists in that it enables a more precise interpretation of information during framing activities and reduces the chance for perceptual error. Those skilled in lateral thinking use techniques to question their initial understanding of the environment and purposefully look for alternative explanations or interpretations for what they perceive.[35] This leads to a more accurate and deeper understanding of the environment during framing. This in turn can lead to 'creative destruction' in which long-held patterns of thought give way to more novel understanding and generate more options for action.

One particular method of lateral thinking is 'escape' thinking. The 'escape method' advocates examining that which we take for granted and questioning 'if they are the only and best way of doing things'.[36] The Israeli Defense Force attack on the Kasbah of Nablus in April 2002 demonstrate the value of this method. The Israelis, determined to clear guerrilla fighters from the Kasbah and a nearby refugee camp, reconceptualised how they saw the urban terrain that housed their enemy. This led to a novel operational form in which the Israelis developed a new understanding of the environment. In the words of their commander at the time:

> *This space that you look at, this room that you look at, is nothing but your interpretation of it. Now, you can stretch the boundaries of your interpretation, but not in an unlimited fashion, after all, it must be bound by physics, as it contains buildings and alleys. The question is: how do you interpret the alley? Do you interpret the alley as a place, like every architect and every town planner does, to walk*

> *through, or do you interpret the alley as a place forbidden to walk through? This depends only on interpretation. We interpreted the alley as a place forbidden to walk through, and the door as a place forbidden to pass through, and the window as a place forbidden to look through, because a weapon awaits us in the alley, and a booby trap awaits us behind the doors. This is because the enemy interprets space in a traditional, classical manner, and I do not want to obey this interpretation and fall into his traps.*[37]

In this instance, the Israelis developed a new understanding of the environment. Rather than view the open urban spaces as manoeuvre corridors through which they must pass to attack the enemy, they instead viewed them as forbidden areas. This led them to see the very structures that used to indicate cover and concealment as the very medium of warfare, a three-dimensional space of constant change and opportunity.[38] This is evidence of the value of breaking patterned thought and the novel ideas that result from changing perspectives.

Doctrine further advocates a deliberate sequencing of divergent and convergent thought to generate creative outcomes. This is evident in how it recommends groups approach brainstorming during framing activities. Doctrine recommends deliberately breaking brainstorming into distinct divergent and convergent phases. During the divergent phase, individuals generate as many ideas as possible to describe the environment or identify relevant actors or relationships. It recommends that individuals work alone before meeting rather than working simultaneously as a group.

When complete, doctrine advocates adopting a convergent approach to making sense of the pool of ideas and concepts. It recommends using affinity mapping to logically cluster ideas for discussion and practical synthesis.[39] This conforms to research that indicates individual efforts (divergent thinking) best support idea generation while group efforts (convergent thinking) best supports evaluation.[40] This balance reduces some of the barriers to creativity. Working separately reduces the influence of bias and cognitive blocking inherent in group work. This expands the breadth and flexibility of ideas.[41] Using groups to evaluate and explore ideas adds depth to ideas. Research indicates this is an optimal division of labour for generating ideas.[42] In short, divergent thinking promotes novel ideation in two critical ways: it helps break the trap of patterned thought to perceive an environment more precisely, and helps inculcate habits of thinking that generate more creative ideas. Both influence how operational artists understand their environment and attempt to act purposefully within it.

The final element to consider in the operational design process is the resultant design concept itself. Examining the specific form of this artefact exposes additional applications of creativity. The design narrative and sketch create meaning and context for those uninvolved in the design process but who must translate its logic into operational outcomes.

The design narrative does more than just describe the environment and direct action—narrative shapes the perception of the environment and communicates the operational artist's understanding of it. It translates contextually-specific knowledge into communication, increasing the likelihood of creating shared understanding with those who will execute the design concept.[43] Further, it 'defines the dimensions in which the reader is likely to view the mentioned artifact [sic]'.[44] The important role language plays in narrative and cognition explains how this occurs. Language

constructs, such as metaphor and analogy, build the context for subordinates to interpret the novelty of the desired operational form. They capitalise on existing conceptual frameworks and schemas as a foundation to interpret the new artefacts.[45] Recall the IDF's new way of viewing urban terrain in Lebanon for an example of this process. The commander relied on metaphor to describe how he envisioned the IDF operating within Nablus. He used terms like 'infestation' and 'swarming' to help subordinates adopt a similar view of urban terrain as a navigable, three-dimensional space. It further indicated that he desired his forces to attack targets simultaneously from multiple directions and then quickly disaggregate.[46] Thus, these metaphors described both an alternate way of sensing the environment as well as a new way of manoeuvring within it.

In addition to helping subordinates understand new concepts, narratives explain the meaning behind an operational form as a whole. Humans rely on narrative as a device to make sense of the environment or concepts. Language builds realities that provide context for understanding an artefact.[47] Narratives carry 'ideas and judgments' that construct that meaning.[48] This is apparent in how narratives address the element of time. Time is a critical element of operational art that differentiates operational art from tactics. In tactics, planners focus on bringing discrete, singular events to a successful conclusion. Operational artists may arrange numerous events in time and space to enact its strategic logic. Narratives offer planners a way to present an operational form that indicates its temporal construct as well communicate its foundational logic. This temporal construct implies a causal link between events and their antecedents.[49] The aggregation of events represents a pattern that constitutes a plot, which is synonymous with the foundational theory of action tied to that specific potential reality.[50] Thus, narratives are a vehicle for creating new ways of making sense of an environment and are themselves creative artefacts.

Planners also use graphical sketches as a means to create shared understanding. Graphical expression employs a different set of skills than narrative expression. It offers the unique ability to visually depict the spatial, conceptual, and temporal relationships within an environment. This creates a 'virtual world' that allows for experimentation in support of theorising.[51] As artefacts, drawings support both the planning and presentation aspects of design. They complement design narratives and extend the medium of dialogue during collaboration. The drawings themselves offer opportunities for novel expression and can promote lateral thinking by influencing perception and conceptualisation of the environment. Finally, design graphics codify the requisite theories of the environment that promote organisational learning.

Summarising the discussion above will illustrate why creativity in the context of operational art is more sensitive to individual attributes than the tactical perspective. Operational artists face less-structured problems open to variable individual interpretations. Design processes rely on collaboration for framing and product development, which increases the chance for divergent opinions resulting from individual perception and expertise. It follows that the amount of expert knowledge and capacity for divergent and lateral thinking will influence that individual's ability to shape the framing activities of design.

## Creativity and tactics

There are two primary interpretations of tactics and tactical thought: a theoretical perspective from scholarly military literature and the doctrinal perspective captured in

current Army doctrine. This chapter incorporates both perspectives to address more comprehensively how a systems definition of creativity reconciles with tactical operations and thought. From a theoretical perspective, tactics relates to the control and employment of forces for individual engagements.[52] Tacticians seek to achieve a specific end state, the achievement of which represents victory.[53] Army doctrine defines tactics as 'the employment and ordered arrangement of forces in relation to each other'.[54] Doctrine further defines a tactical mission task as 'a specific activity by a unit while executing a form of tactical operation or form of manoeuvre. It may be expressed as either an action by a friendly force or effects on an enemy force'.[55] These statements indicate the Army's view that tactics correspond to discrete, finite actions intended to achieve specific purposes relative to an enemy or the environment.

This specific ecology of tactics will influence the propensity of creative outcomes as described in the previous sections. To review, creativity is an emergent outcome resulting from the interaction of expertise, process, and environment. Creativity in the tactical context is restricted to adaptive behaviour and outcomes and not truly creative ones. This occurs due to the prescriptive planning methodologies used in conducting tactical actions, lack of organisational learning processes, and the nature of interactions at the tactical level.

The purpose and nature of tactical planning methodologies restricts opportunities for theorising, learning and collaboration which are integral to generating creative outcomes. Foremost, tactical thinking and planning seeks to conduct a specific action or series of actions that results in a specific effect on either the enemy or the environment.[56] Thus, tactical planning methodologies develop the orders that focus actions within the environment and synchronise resources to bring about the desired end states. In short, tactical planning drives action and focuses on operating within a specific space with known physical, temporal and logical boundaries.

This focus on action frames tactical thinking on specific outcomes such as a decision, mission, course of action or order, rather than on understanding alone.[57] Doctrine defines planning as 'the art and science of understanding a situation, envisioning a desired future, and laying out effective ways of bringing that future about'.[58] Doctrine further states that planning primarily addresses barriers or conditions that prevent the commander from achieving the desired future state. This frames planning as a component of a broader problem-solving methodology.[59] In fact, Army doctrine recognises three distinct planning methodologies: ADM, MDMP, and Troop-Leading Procedures (TLPs).[60]

Doctrine further ties its planning activities to problem-solving by recommending which methodology to use as a function of the complexity of the problem it addresses. Doctrine recommends staffs to use MDMP to address well-structured and medium-structured problems and to use ADM to address ill-structured problems. Doctrine defines medium-structured problems as problems in which the problem and end state are clear but there is disagreement in 'how to apply doctrinal principles to a specific piece of terrain against a specific enemy'.[61] This doctrinal framework relegates tactical planning to a 'search' framework of problem solving in which commanders select a series of actions from a set of pre-existing capabilities to best address the unique circumstances of the unit, environment, and enemy that seeks to apply an existing set of potential actions. In short, a selection process does not require generating new ideas or solutions, rather it requires the judicious application of tactical tasks to solve a presented or anticipated problem.

Tactical planning methodologies further restrict opportunities for novelty by constraining its knowledge base and inhibiting effective collaboration. The search nature of tactical problem-solving restricts potential actions to an existing set of options. In military terms, this set of options corresponds to tactical tasks, enabling tasks, and forms of manoeuvre found in Army doctrine. Thus, the tactical doctrine itself serves as the knowledge base from which ideation or solutions emerge. Because tactical planning is a search methodology, the process would require additions to or recombination of existing knowledge to generate a novel outcome. The temporal nature of tactics prevents timely additions to the knowledge base to create novelty within the tactical planning cycle. This would require additions to the current set of doctrine, which is beyond the time constraints of tactical ecology. Furthermore, the prescriptive nature of tasks themselves prevents their recombination into new tactical tasks or outcomes. Tactical tasks are not aggregated into some new task by echelon, rather commanders arrange tasks in time and space to achieve a specific outcome. Because commanders frame end states in doctrinally-precise, existing terms, these outcomes cannot be novel.

The planning process further restricts collaboration and opportunities for novel ideation and perception, elements which contribute to creative outcomes. Rigid guidelines govern almost every aspect of the MDMP. Doctrine specifies the sequential steps of the MDMP in Chapter 9 of FM 6-0. This chapter further specifies the key inputs, processes, and outputs along each of the seven steps of MDMP. This prescriptive framework has two critical influences on creativity. First, it removes any need to develop new ideas about how to approach the planning process due to its myopic focus on the end-state. Additionally, dividing work steps and outputs by functional expertise reduces the need to collaborate. Knowledge management literature indicates collaboration can promote creativity via idea generation because groups will need to develop new ideas or adopt new perspectives to resolve tension created by competing theories about an environment or a solution.[62]

This division of efforts and compartmentalised approach to planning also inhibits an organisation's ability to generate new knowledge or learn, both of which require creativity. Organisational learning requires a unit to produce a formalised hypothesis of its environment.[63] Organisations must also institute 'rules for learning' to apply abstracted experiences or theories with a communication strategy that distinguishes future behaviour as adaptation and not 'rote iteration of past successful actions'.[64] Army doctrinal tactical planning lacks the requisite formalised communications framework to coordinate distributed experiences for higher-level abstraction due to its reliance on mission-oriented orders and the prescriptive structure of unit after-action reviews (AARs).

Foremost, orders are the primary means of communicating at the tactical level. Paragraph one (Situation) or Annex Bravo come closest to presenting a formalised hypothesis of the environment; however, it is descriptive in nature and limited to discussing anticipated actions of a rival or other actor. Furthermore, doctrine prescribes units to present the higher headquarters' understanding and visualisation of the enemy as a part of its intelligence annex.[65] This could potentially lead to conformity bias if subordinate staffs accept such inputs uncritically. This organisational nesting and the one-way nature of orders results in efficient use of resources; however, it removes flexibility for subordinate units to operate with a divergent view of the environment. The lack of formalised assessments to invalidate an operating hypothesis, combined with the short-duration nature of tactical engagements, further restrict a unit's ability to increase organisational knowledge.

The doctrinal structure of after-action reviews, the one formal procedure in doctrine aimed at learning, also fails to promote organisational learning. The Army's AAR procedure does not require abstracting experiences for higher-level synthesis. This is evident in doctrine's overall focus on the unit's performance relative to its plan rather than a focus on the plan's merits relative to an enemy or the environment. Doctrine states that AARs aim to reconcile observations of performance with what the unit planned to do for the sake of correcting task performance deficiencies. It further recommends updating unit standard operating procedures or capturing updates as lessons-learned. However, it stops short of clarifying how best to dispose of after-action reports beyond stating that they should be sent to other units conducting a similar mission, doctrinal proponents, generating force agencies, and the Center for Army Lessons Learned (CALL).[66] Doctrine does not specify what actions to take beyond sending reports, such as how to coordinate disparate reports to create refined understanding. This lack of a forcing function to abstract experience to refine environmental understanding limits learning to the tacit domain of the individuals who participate in a specific AAR. This restricts any learning that does occur to enhancing organisational memory, but not organisational knowledge.

Some readers may sense a biased argument in this section's sole focus on MDMP as the process that supports tactical planning. Doctrine does in fact permit the use of ADM to support tactical planning.[67] However, the context of tactics prevents tactical planners from leveraging novel outcomes from design processes. While design can lead to a better understanding of the environment, tacticians still employ a search-model of decision-making framework in which they select tasks and forms of manoeuvre from an existing body of doctrinal knowledge.

To review, the ecology of tactics and the organisational approach to planning limit the opportunity for tactical creativity. The teleological nature of tactics attempts to remove uncertainty and variation in outcomes, reducing the value of novel action or outcomes. The MDMP, as a prescriptive planning process, does not incentivise collaboration of a nature that leads to novel ideation or organisational learning. This procedural approach also anchors planners within their specific area of expertise, further inhibiting conceptual exploration. Finally, doctrine's teleological treatment of tactics focuses organisational learning activities on process improvement and best practices rather than the creation of new knowledge.

## Conclusion

The discussion above addressed creativity in the context of military operations. It seeks to inform readers of the mechanics governing creative outcomes and how the value and propensity of creativity depends on perspective. Neither Army doctrine nor literature adequately addresses the phenomenon. Both treat creativity as a specific way of thinking to complement critical thought, effectively reducing it to an individual attribute that should lead to better judgment or ideas. This 'black-box' understanding fails to inform commanders and staffs about ways to promote or exploit novel outcomes or artefacts.

This paper uses systems theory to define creativity as novel outcomes resulting from the interplay between expertise, cognitive ability, process, and ecological context of operation. This definition illustrates how the nature and value of creativity changes with perspective. From a strategic perspective, creativity is manifest in the novel theories that provide the guiding logic for operational planning. Similarly, operational artists develop novel theories to describe the environment and guide action;

however, creativity most influences organisational learning. Finally, the ecology and logic of tactics creates a system that favours adaptation over novelty.

# Notes

[1] This chapter is based on the following US Army School of Advanced Military Studies monograph: Major Matthew Furtado, 'Creativity in Complex Military Systems', 2017.

[2] Disclaimer: The views and opinions expressed in this chapter are those of the author and do not reflect the opinions or any official position of the US Army, the US Department of Defense or the US Government.

[3] Alfred North Whitehead, *Dialogues of Alfred North Whitehead*, Ed. Lucien Price (Boston: David R. Godine, 2001), pp. 280-281.

[4] Emphasis added. Army Doctrine Reference Publication (ADRP) 5-0, *The Operations Process* (Washington, DC: US Government Printing Office, 2012), pp. 2-4.

[5] ADRP 6-0, *Mission Command* (Washington, DC: US Government Printing Office, 2012), pp. 2-8.

[6] ADRP 6-0, *Mission Command*, p. 156.

[7] Basil Henry Liddel Hart, *Strategy,* 2nd ed. (New York: Meridian, 1991), p. 322.

[8] E. Paul Torrance, 'Education and Creativity' in: Albert Rothenberg & Carl R. Hausman (Eds.), *The Creativity Question* (Durham, NC: Duke University Press, 1976), pp. 219-223.

[9] Bernard A. Nijstad, Michael Diehl & Wolfgang Stroebe, 'Cognitive Stimulation and Interference in Idea-Generating Groups' in: Paul B. Paulus & Bernard A. Nijstad (Eds.), *Group Creativity: Innovation Through Collaboration* (Oxford: Oxford University Press, 2004), p. 145.

[10] Stanley G. Harris, 'Organizational Culture and Individual Sensemaking: A Schema-Based Perspective' in: James R. Meindl, Charles Stubbart & Joseph F. Porac (Eds.), *Cognition Within and Between Organizations* (Thousand Oaks, CA: Sage Publications, 1996), p. 287.

[11] Harris, 'Organizational Culture and Individual Sensemaking', p. 287.

[12] Edward de Bono, *The Mechanism of Mind* (New York: Simon and Schuster, 1969), p. 230.

[13] *The Applied Critical Thinking Handbook, v. 8.0* (Fort Leavenworth, KS: University of Foreign Military and Cultural Studies, 2016), pp. 108-155.

[14] Krippendorf defines second-order understanding as understanding that accounts for how the user of a design artefact will interpret its meaning. In this context, second-order understanding applies to how a rival views and interprets the environment. Klaus Krippendorf, *The Semantic Turn: A New Foundation for Design* (Boca Raton, FL: Taylor & Francis, 2006).

[15] Carl von Clausewitz, *On War*, Ed. and Trans. Michael Howard & Peter Paret (Princeton: Princeton University Press, 1976), p. 75.

[16] T. E. Lawrence, *Seven Pillars of Wisdom: A Triumph* (New York: Random House, 1991), pp. 188-189.

[17] Lawrence, *Seven Pillars of Wisdom*, p. 192.

[18] There are formal individual and group processes to actively seek alternative interpretations of the environment, such as Four Ways of Seeing and Analysis of Competing Hypothesis. See *The Applied Critical Thinking Handbook v. 8* for an expanded discussion of these processes.

[19] Lawrence, *Seven Pillars of Wisdom*, p. 194.

[20] Robert Axelrod & Michael D. Cohen, *Harnessing Complexity: Organizational Implications of a Scientific Frontier* (New York: Basic Books, 2000), p. 8.

[21] Francois Jullien, *The Propensity of Things: Toward a History of Efficacy in China*, Trans. Janet Lloyd (New York: Zone Books, 1999), p. 37.

[22] Jullien, *The Propensity of Things*, pp. 33-34.

[23] Everett Carl Dolman, *Pure Strategy: Power and Principle in the Space and Information Age* (New York: Frank Cass, 2005), p. 157.

[24] Frans P. B. Osinga, *Science, Strategy, and War: The Strategic Theory of John Boyd* (New York: Routledge, 2007), p. 125.

[25] Osinga, *Science, Strategy, and War*, pp. 125-126.

[26] John Andreas Olsen & Martin van Creveld, 'Introduction' in: John Andreas Olsen & Martin van Creveld (Eds.), *The Evolution of Operational Art* (Oxford: Oxford University Press, 2011), p. 1.

[27] Army Doctrine Publication (ADP) 3-0, *Operations* (Washington, DC: US Government Printing Office, 2016), p. 4.

[28] Dolman, *Pure Strategy*, p. 13.

[29] Brian Logan & Tim Smithers, 'Creativity and Design and Exploration' in: John S. Gero & Mary Lou Maher (Eds.), *Modeling Creativity and Knowledge-Based Design* (Hillsdale, New Jersey: Lawrence Erlbaum Associates, 1993), p. 140.

[30] Army Techniques Publication (ATP) 5-0.1 *Army Design Methodology* (Washington, DC: US Government Printing Office, 2015), pp. 1.3-1.4.

[31] ATP 5-0.1, p. 1.7.

[32] ATP 5-0.1, p. 1.9.

[33] Frances J. Miliken, Caroline A. Bartel & Terri R. Kurtzberg, 'Diversity and Creativity in Work Groups: A Dynamic Perspective of the Affective and Cognitive Processes that Link Diversity and Performance' in Meindl, Stubbart & Porac (Eds.), *Cognition Within and Between Organizations,* pp. 46-47.

[34] Ikujiro Nonaka, 'The Knowledge Creating Company' in: *Harvard Business Review on Knowledge Management* (Boston: Harvard Business School Press, 1998), p. 43.

[35] Edward de Bono, *de Bono's Thinking Course* (New York: Facts on File, 1982), pp. 69-70.

[36] de Bono, *de Bono's Thinking Course*.

[37] Aviv Kochavi, quoted in: Eyal Weizman, 'Walking Through Walls'. Online: http://eipcp.net/transversal/0507/weizman/en, accessed 16 March 2017.

[38] Weizman, 'Walking Through Walls'.

[39] ATP 5-0.1, pp. 3.7-3.8.

[40] Nijstad, Diehl & Stroebe, 'Cognitive Stimulation and Interference in Idea-Generating Groups', p. 157.

[41] Steven M. Smith, 'The Constraining Effects of Initial Ideas' in: Paulus & Nijstad (Eds.), *Group Creativity*, p. 29.

[42] Nijstad, Diehl & Stroebe, 'Cognitive Stimulation and Interference in Idea-Generating Groups', p. 157.

[43] Hayden White, 'The Value of Narrativity in the Representation of Reality', *Critical Inquiry,* Vol. 7, No. 1 (1980), p. 5.

[44] Krippendorf, *The Semantic Turn,* p. 54.

[45] Antoine Bousquet, *The Scientific Way of Warfare: Order and Chaos on the Battlefields of Modernity* (New York: Columbia Press, 2009), pp. 26-27.

[46] Weizman, 'Walking Through Walls'.

[47] Krippendorf, *The Semantic Turn,* pp. 20-21, 59.

[48] H. Porter Abbott, *The Cambridge Introduction to Narrative*, 2nd ed. (Cambridge: Cambridge University Press, 2008), p. 67.

[49] Paul Ricoeur, 'Narrative Time', *Critical Inquiry,* Vol. 7, No. 1 (1980), p. 171.

[50] Ricoeur, 'Narrative Time', p. 178.

[51] Donald A. Schon, *Educating the Reflective Practitioner* (San Francisco: Jossey-Bass, 1987), p. 77.

[52] Clausewitz, *On War*, p. 128.

[53] Dolman, *Pure Strategy*, p. 126.

[54] ADRP 3-90 *Offense and Defense* (Washington, DC: US Government Printing Office, 2012), p. 1.1.

[55] Field Manual (FM) 6-0 *Commander and Staff Organization and Operations* (Washington, DC: US Government Printing Office, 2014), p. Glossary-9.

[56] Dolman, *Pure Strategy*, p. 13.

[57] FM 6-0, p. 9.1.

[58] ADRP 5-0, p. 2.1.

[59] ADRP 5-0, p. 2.2.

[60] Doctrine prescribes that units with coordinating staffs primarily use the MDMP as their primary planning process.

[61] FM 6-0, p. 4.1.

[62] Nonaka, 'The Knowledge Creating Company', p. 43.

[63] Mariann Jelinek, *Institutionalizing Innovation* (New York: Praeger Publishers, 1979), p. xviii.

[64] Jelinek, *Institutionalizing Innovation,* pp. 161-162.

[65] FM 6-0, p. D.11.

[66] FM 6-0, p. 16.2.

[67] FM 6-0, p. 9.1.