



SMALL WARS JOURNAL

smallwarsjournal.com

The Logic and Method of Collaborative Design¹

Huba Wass de Czege

Introduction

The logic and method of design outlined below is first and foremost *a collective research methodology* for considering the best available information to make sense of what is known in order to construct an *explicit and shared* hypothesis of the very unique, dynamic and complex power and influence networks that pertain to the mission and how to act through them to take best advantage of the inherent situational potential for change. It is also a collective methodology for continually refining the *command's* understanding of them, and for facilitating *collective* adaptation accordingly.

Emphasize Doing Design Explicitly and Logically to Formulate and Re-formulate the Contingent Logic for Near-Term Action

In a fundamental way, “design” is deciding what, in this particular mission case, is the “right” thing to do. In other words, it is imposing a logical structure over a very messy and hard to understand situation. When that logical structure is not self-evident it must be imposed on the situation by a conscious command decision, one that needs to be made before any deliberate, coherent or purposeful action can be taken, one that settles on an *explicit formulation* of the way the mission world is *assumed* to function and of how to exploit the potential for positive change within it. But modern military operational design is also a greater continuous collective and cyclical thought process for testing and transforming any and all previous “designs” as the mission context evolves over the span of a campaign.

It is increasingly difficult to write doctrine for the variety of mission situations that we can encounter today. Historical experience provides us examples that are often more different than similar to the mission contexts we face. For instance, an uncritical and formulaic imposition of the doctrinally prescribed aims and lines of operations drawn from the recently published COIN manual would be imposing a foreign logic upon a unique situation. We need a way to test the applicability of accumulated wisdom in all of its forms, and *transform what we think we know*

¹ What is written here does not differ substantively from the intent of what is now in US Army doctrine. It is, however, a more complete elaboration of the art of design for extended operations, and at multiple echelons, based on my own experience and study. I owe much to other colleague's for my education, most notably to Brig. Gen. (Res) Shimon Naveh, Dr. James Schneider, Dr. Timothy Challens, and Dr Alex Ryan. They might not fully agree with all my views. I have my own way of approaching the subject.

into newer more applicable wisdom tailored to the mission at hand. A critical and collaborative design inquiry by the unit's command team does that.

In my experience of teaching effective operational design practices over the past few years, very experienced and highly capable commanders and planners often say, "We do design already." Commanders may derive their "design" from several natural sources: logical similarities between current and past cases; logical templates provided by doctrine (such as the standard logical lines of effort drawn from the Army and Marine Corps Counterinsurgency Manual); "elements of design," such as "centers of gravity;" and the perspectives of respected experts and colleagues. Such references may structure their understanding of the mission situation. But such use of references is rarely rigorous, systematic, collaborative or explicit. And when people don't distinctly separate thinking about mission problem framing from mission problem solving, integrating both during their mission analysis, they often end up choosing among courses of action that are not only different ways to solve the mission-problem, but are also different ways to frame it. The thought process for solving problems is different from the one for setting problems. And those who say "We do design already" rarely employ a method that seeks to aggressively and systematically falsify the underlying lattice-work of "if-this-then-that" ideas, drawn from various sources, upon which their planning and actions are based.

The more thorough the design inquiry, the better the basis for tactical planning, and the more likely is headway toward mission success. And because it will always be difficult to avoid hidden and invalid assumptions of causal logic, that are drawn from past experience in different circumstances or from irrelevant doctrine, it is always useful to expose that lattice-work to light by making all parts of it explicit, and exposing it to rigorous examination from multiple perspectives. And, having examined and accepted this contingent logic, it is also useful to record it. It is far easier to test and revise an explicit than an implicit logic.

The recent Army definition of "design" as "a methodology for applying critical and creative thinking to understand, visualize, and describe complex, ill-structured problems and develop approaches to solve them" *could lead the new practitioner astray.*

Critical and creative thinking is valuable to many arts and endeavors. Design is mainly about "making sense" of a difficult to understand and continually evolving situation. It is complex *situations* rather than "problems" that appear to have no logical structure. Problems are in our minds. Situations are in nature. It is the commander's task to apply judgment and synthesis (as opposed to chiefly analysis) to create a structured logical understanding – a hypothesis -- that becomes the assumed "problem" the commander *chooses* to solve through tactical actions. What he must describe is *his* strategic understanding or *theory* of the situation (its evident inner relationships, tensions, tendencies, and potential for positive change), and not the "ill-structured problem."

The "describe complex, ill-structured problems and develop approaches to solve them" portion of the definition is also misleading, implying description of something that already exists, and is durable. Design is rather making rational the seemingly irrational so that tactical planning and tactical action can proceed on a sound footing. The object of design is to create a *contingent*

logic, when none is self-evident, that *exploits the potential for change toward an improved state* upon which to base a tactical plan of action.

“Visualization,” defined by the Army as “envisioning the broad sequence of events by which the force will achieve the end state,” is a misleading term to use in the definition of operational design because it implies backward planning. Commanders can visualize a sequence of tactical events in an engagement, but they cannot visualize how a campaign might unfold. It is useful to describe an envisioned *tactical* scheme of maneuver toward a near term *tactical* objective, and to apply a backward planning logic to tactics that unfold in a short timeframe engagement. It is not useful to do the same for even a small-scale campaign of greater duration. Modern extended missions unfold while immersed in complex and continually evolving human social situations. The mission-situations of extended operations will tend to evolve continually as the humans within it act unpredictably based on their intentions and beliefs. It would be misunderstanding the nature of open complex human systems to think that backward planning from a visualized “end state” would work, as it would in a closed mechanical or “complicated” system. Imagine trying to draw a route map to a fixed point in terrain that is constantly in motion. And it would be misunderstanding the nature of groups of human beings to think that closed (mechanical) system causal logic could be relied upon to change their behavior. Over time, any “visualized” end-state can become irrelevant and over- or under-ambitious, or *even unattainable* by the road initially taken, simply because initially imperceptible internal forces continually cause unpredictable change. They must understand the situation well enough to get things headed in the “right,” rather than “wrong,” direction while they continue to learn and adapt. They need to explain the logic *unique to this situation* that planners should assume *to exploit the potential for positive change*. It may be helpful to define a tentative cluster of parallel and sequential goals that, when pursued, could lead to an acceptable mission solution. This much is essential for effective tactical planning and useful action, but more is not necessary. The design of the moment sets (or frames) the current mission problem for near term tactical actions only.

Designs evolve as understanding evolves. Even if the contingent logic for exploiting the potential for change where perfectly understood, a great unlikelihood, as time passes it will become obsolete. A focused search for better understanding of the situation continually strives to *falsify or disprove* the operative one, and to formulate a new one. Learning drives reformulation, which drives tactical adaptation. This is analogous to the process for advancing scientific knowledge.

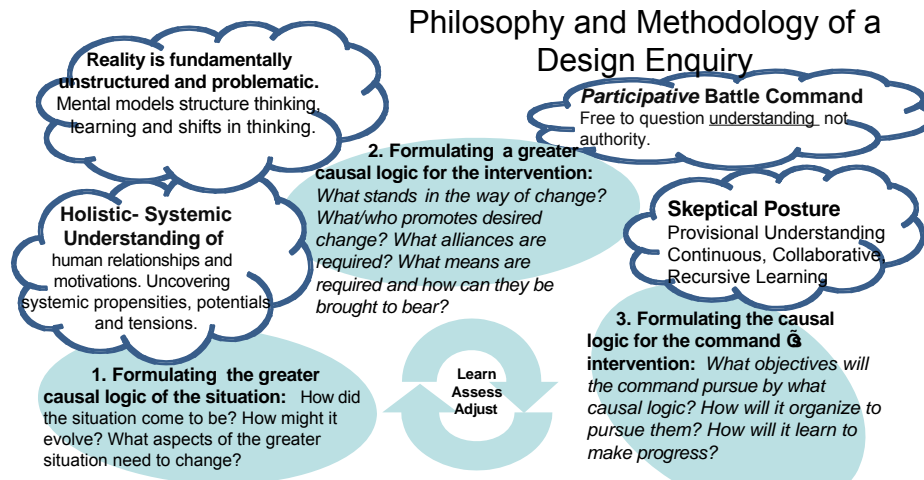
The doctrine rightly stresses the creative aspects of design, as in architecture and in industrial and other fields of design, but it under emphasizes the necessary intellectual rigor of a greater continuous collective thought process for testing and transforming *what we think we know into newer more applicable and situation-tailored wisdom*.

And Doing it Collaboratively is Best

Effective design requires *systematic² collective critical and creative thinking* within a headquarters. Accomplishing that goal means using a systemic cognitive methodology that

² Systematic means “according to a system or method” or “orderly in doing things.”

systematizes relationships of human actors³ and a collective design approach that benefits from multiple perspectives introduced in a rigorous and disciplined way. The “mission-problem” is more likely to be a shared view within the headquarters, better defined, and more rigorously documented making re-definition easier and faster. Tactical planning is likely to proceed more effectively and more rapidly.



Builds a shared understanding layer-by-layer through a recursive dialectical process:
 ĞForms a tentative explanatory theory based on the best information available.
 ĞTests it by identifying problems or tensions between the theory and new information or perspectives.
 ĞConstructs a new theory to resolve such problems.
 ĞMaintains cross-talk higher to lower, among Ğcommand teamĞand with subordinates.
 Defines objectives in terms of changes in human behaviors and formulates a provisional causal logic for obtaining them.

The figure above outlines the major ideas of this approach. This collective design methodology assumes a continual, cyclical assessment for relevance and periodically feeds new guidance to planners and subordinates. The procedural workhorse of the command’s design enquiry is the layer-by-layer recursive dialectical case-building process outlined at the bottom of the previous figure.

The Philosophy and Methodology of Collaborative Design

Design is philosophically different than tactical planning. Principally, whereas tactical planning employs analytical thinking to derive optimized “real world” solutions to an assigned “problem,” design employs a combination of analytical, inductive and abductive thinking (much as a doctor’s diagnosis does) to build a unique cognitive construct that represents the command’s best judgment of what needs doing to succeed in the assigned ambiguous mission. Therefore, whereas the art of tactical planning benefits from modes of thinking derived from the science of systems engineering, or “hard systems thinking,” the art of design benefits from “soft systems thinking”

³ System means a combination of related elements organized into a rational whole or an assemblage of elements forming a whole unified by the nature of their relationships. Systematize means “to form into a system.” Systemic means “to affect or address the entire organism or bodily system.” To apply a systemic cognitive methodology means to aggregate elements into meaningful wholes or systems of meaningful relationships.

or Soft Systems Methodology (SSM)⁴ that has evolved out of the science of systems engineering over the past thirty years specifically to address human affairs systemically.

The SSM approach is in accord with the way experienced military professionals naturally think of human affairs. SSM implicitly takes as given that “human systems” can only be complex systems, and that human beings, the product of their genetic inheritance and previous experiences, continually negotiate and renegotiate with others their perceptions and interpretations of the world outside themselves. And from this follows the idea that the course of human affairs is continually generated and regenerated from inside the system rather than from outside. This view rejects the “goal seeking,” and “cybernetic” models of human life imposed by earlier systems engineering approaches for making sense of human affairs, as have most savvy military professionals, because human goals are seldom singular, compatible and rational. All systems researchers conceptualize the world in terms of a system of layers. The system researcher or observer interested in understanding, say for example, the group of people referred to as “Hizbullah” will construct a “system” of relationships that describe and explain it. They will also conceive of the relationship of this system to a “wider system” above and to component “sub-systems” below. SSM is unique in surfacing the worldviews of relevant actors. For instance, some implicit tenets of SSM are that individual humans and groups: perceive the world selectively, making judgments of fact (is this the case?) as well as of value (is it good or bad, acceptable or unacceptable?) about it; they envisage acceptable forms of the many relationships they have to maintain over time; and they act to balance those relationships in line with their judgments.⁵

Most importantly, this approach rejects the notion that human beings can be caused to act a certain way, as in a mechanical closed system causal chain. “Since human beings act for reasons, having intentions made up of beliefs and desires, the realm of human activity possesses much more difficult and much less scientific predictability. ... Representing reality on the basis of cause and effect does not develop robust enough understanding to enable informed and meaningful action.”⁶ This way of thinking was the downfall of “Effects Based Operations.”

Collaborative design is commander-led, and the commander decides key questions concerning the interpretations of facts and the acceptance of key causal theories, but the quality of the result depends on the commander’s willingness to entertain and consider challenges to his or her understanding (without considering them as a threat to authority or position). An important aspect of this methodology is that every product is sanctioned by the commander (or leader responsible for the action and outcome along a particular line of effort), otherwise it would be a staff product without sufficient authority to be the basis for command tactical planning. Questioning to achieve shared understanding of facts and expected consequences is a mark of professional conduct, not a challenge to authority to decide and direct. True discipline requires honest professional dialogue between peers, with subordinates, and particularly with superiors.

⁴ Soft System Methodology is an approach to making sense or rationalizing human affairs. Scientists such as Geoffrey Vickers and P.B. Checkland and others have evolved this methodology over the past thirty years. The methodology presented here builds on some of this work.

⁵ P.B. Checkland, *Soft Systems Methodology*, page A41.

⁶ Lieutenant Colonel Tim Challans, U.S. Army, Retired, Ph.D. “Tipping Sacred Cows: Moral Potential Through Operational Art,” *Military Review*, September – October 2009. P. 25.

Learning about complex situations is very much a bottom up process. Business literature has long advocated “management by walking around.” The military leadership version is called “battlefield circulation.” The understanding of leaders is greatly enhanced when subordinates one or two levels down share their understandings candidly.

Because systems of human relationships, the ecosystem of today’s missions, are complex rather than complicated⁷, design requires maintaining a skeptical posture. Every interpretation of systemic relationships is challengeable. Every analogous case is judged not only by the similarities but also by the differences. Every understanding is provisional. Collaborative and recursive learning is continuous. Every explanation is up for challenge. Every key assumption of logic is repeatedly reviewed.

There are three basic modes of logical reasoning that play roles in scientific inquiry, processes currently known as *abductive*, *deductive*, and *inductive* inference. These modes of logical reasoning are used in the following way to advance the understanding of open complex systems. Abduction generates a *possible* hypothesis to account for a surprising phenomenon. (Abductive reasoning starts when an inquirer considers a set of seemingly unrelated facts, armed with an intuition that they are somehow connected. Diagnosticians and detectives are commonly associated with this style of reasoning.) Deduction clarifies the relevant *necessary* predictive consequences of the hypothesis. And because induction generalizes from a singular observation it tests the predictions against the observed situation.

Design relies on mental models to structure thinking, learning, and shifts in thinking about a reality that is fundamentally unstructured and intractable. A map is best for describing and explaining relevant relationships economically. A narrative is best for describing and explaining the logic and sequence of how the situation evolves. Doing both is best.

Design is somewhat similar to the process called Intelligence Preparation of the Battlefield (IPB) in that it takes a systematic approach to organizing a systemic understanding of the situation, but it differs in significant ways. IPB builds a theory (“doctrinal” and “situational” templates) to describe how the “enemy” should or could act in a given tactical situation based on what is known of his doctrinal patterns, and recent behaviors. But it must assume knowledge of the enemy mission and intent, and it must also assume a problem definition and friendly patterns of behavior. This design methodology needs to make no such assumptions, and takes a much more holistic approach. For instance, in addition to other obvious differences of focus, if an important mission hindrance turns out to be the corrupt, lawless, and destructive behavior of a necessary mission ally, design takes this into account whereas IPB normally might not.

⁷ This refers to a distinction made by the author in the previous article. Complex systems are interactively dynamic, impossible to separate from their environment, impossible to “see” all players and relationships without engaging the system, are subject to change through the interaction of internal forces, and are subject to “self-regulation.” Understanding them implies overlaying an artificial logical structure for the purpose of transforming them to a more desired self-regulating state. Systems of humans are complex. Complicated systems are stable (normally man-made) structures that do not change of themselves, but require outside energy to change them. They may be made of very many sophisticated parts and pieces, but they are separable from their environment, and understandable by observing, studying their parts, and mapping their components.

Because of the novelty of all complex situations, templates and general theories based on analogy or developed for previous cases can often lead to doing the wrong thing, no matter how correctly we do them. *Sound strategies rest on being able to describe and explain four unique well grounded theories about the mission-situation.* The first of these describes and explains the causal logic for the *systemic emergence*, the new development within the system that has prompted the mission. This is the one upon which the other theories, and the mission strategy, are constructed. A second one imposes a unique *logical structure on the systemic intervention* to bring about desired changes in behaviors of system actors and in positive and negative systemic trends. While historical or generalized theories provide foils for reflection, they should not be applied without reflecting on the impact of novel and specific aspects of the unique case before us. A third one imposes a unique *logic, structure and discipline for how to learn* about the unique and continually unfolding situation confronting us. The novel and the complex require special attention to a process called *forward learning*, the notion of setting the conditions *beforehand* for effective learning *during* the intervention. This is required because systems theory and experience tells us that our own interventions will create unpredictable changes in the contextual system.⁸ A *theory of organization* imposes a logical structure for organizing functions and effort in space and time. Generalized doctrinal or historical patterns may be useful for reflection, especially for gaining insight about the uniqueness of the present case and necessary changes to organizing theories proposed by doctrine for the general case. These foundational theories become the substance of the design. They are neither right nor wrong. They are either useful or not. They require continual reformulation as our knowledge about the situation expands and evolves.

The Three Groupings of Cognitive Activity

The three numbered ellipses in the previous figure represent the three main groupings of cognitive activity, or stages of design, associated with this methodology. The first represents a point of beginning followed by the second and third. Just as in the military decision-making thought process,⁹ there is a logic to this sequence, but this thought process is far less rigid, in that, while the logic of the second and third stages builds upon the understanding of the situation built previously in the first, it is not uncommon to learn something in a later stage of thinking that clarifies the previous ones. The circular arrow indicates a normal recursiveness of the discipline of this design methodology that requires making adjustments to the previously formulated latticework of ideas before moving forward again. This ensures a critical thought process. This circularity of the stages of this research methodology also indicates that there is no beginning or end to collaborative design during an extended operation. Regardless of how well the situation is understood at any point in time, human systems evolve even without outside stimulus.

⁸ This is the most ignored product of designs I have experienced. Learning occurs most expeditiously from asking the right questions. If our strategy rests on the hypothesis that all swans are white then we must be on the lookout for swans of another color. We must think clearly about what kind of evidence would falsify our hypothesis, rather than searching merely for confirmation.

⁹ The Military Decision-making Process or MDMP was developed based on the logic of the engineering problem solving methodology. It was also designed principally for tactical decision-making rather than for strategic decisions. It remains an unsurpassed approach for its intended purpose.

The first stage of design formulates the greater logic of the situation. For instance, how did the situation come to be, how might it evolve, and what aspects of the greater situation need to change? This creates a frame of reference for further learning that extends well beyond the writ of the command to affect, but is necessarily from a higher level and wider perspective. A simple guide is to try to take a “birds-eye” perspective at least two echelons of authority higher and one that broadly takes a fresh, institutionally “un-blinded” look at all forms of human influence networks that may have created the situation higher authorities have asked the command to address. Without a theory of the situation that describes and explains the contextual dynamics (the inner forces that influence systemic change) that this stage of the enquiry uncovers, no sound design can emerge.

Based on the framework of reasoning and logic of the first stage, the second stage of design formulates the greater logic for an intervention to transform the situational system as it is (or seems to be) into a system that would satisfy the desires of higher authorities and the broad intent of the mission. As a minimum this stage of the enquiry would clarify: what stands in the way of change; what and who also promotes desired change; what alliances are required and helpful to affect systemic change; and what means, such as will, energy, resources and capabilities, are required and how can they be brought to bear? This reasoning develops a theory of how the situation can be transformed to the desired state considering all *practical* forms of efficacy (power to bring about results); for example, from a “whole of governments” perspective, *inclusive* of the command’s role in the intervention. The issue of practicality is an important one at this stage of design. Without a theory of transformation by such a broad and holistic intervention, one that describes and explains the role of all players and accounts for all systemic trends and tendencies, the command’s own mission design might not mesh well with other influences in the mission context.

The third stage of design formulates the logic for the command’s own intervention. This stage of the enquiry must answer at least these four questions: what specific objectives (in terms of desired behavioral changes of specific systemic actors) will the command pursue by what logic; how will it organize to pursue them, both internally and by, with, and through others; how will it learn to make progress; and what messages must this intervention send to relevant publics?

Collaborative design is a continuous and recursive journey of learning. No commander should be satisfied with his understanding of the situation. And no design is a finished product. It is only a provisional platform of logic for short-term tactical plans and immediate actions.

This overview of the philosophy and stages of design is now followed by a more detailed description and explanation of each of the three stages and how these relate to one another. It is important to note at this point that following the philosophy and logic of this approach is useful even when time and initial knowledge of a situation is limited, and all of the questions suggested by this approach cannot be fully answered. Design is an iterative and continual process, relevant detail is inserted into the lattice-work of ideas as learning takes place, and enriches over time. *The rigorous discipline of this methodology leads to more rapid growth of relevant knowledge than a less structured approach would.*

Stage 1 of Design: Formulating the “Theory” of the Situation

This stage of design is addressed anytime there is a reason to take a fresh look at the situation. For instance, there could be an obvious and significant new emergence in the flow of events that prompts the commander to redesign. The command could be assigned a new mission. The command, during extended operations, may institute a periodic review of this stage of design, or something that has been learned in a later stage prompts a fresh look at an earlier one.

As noted above, the first stage of design formulates the greater logic of the situation, or the theory of the situation. This theory comprises three sub-theories that organize critical and creative thinking during this stage and become the logical foundation for later stages of design: a theory of how the system emerged; a theory of current systemic relationships and their inherent evolution (the observed system); and a theory of desirable systemic relationships and behaviors (the desired system).¹⁰

The first step to constructing (or revising) these theories, is to thoroughly “read into” the situation, and to examine (and re-examine) higher authority guidance to understand the situation from a higher level, to note intentions, concerns and desires. Every situation has a history, and being informed of it not only highlights significant actors and relationships, but also helps to understand trends and tendencies in relationships. Higher authorities are themselves constrained or motivated by applicable policies, laws, treaties, and formal or informal agreements. As noted previously, they may be acting under pressure and without a full appreciation of the emergent situation, and the policies, laws, treaties, and formal or informal agreements that motivate and constrain them are based on a previous situation – they may not accord with the emergence. This review will indicate what is relevant, what is undesirable about the situation, and what changes are judged desirable. It will also uncover the often-implicit causal logic at the base of the mission assignment. This guidance, if taken too literally in this stage of design, will impose blinders and hamstring creativity. Ignoring it would diminish critical thinking.

The next task is to record observed reality and learn about its complex evolution. This requires constructing a “contextual system,” a broad conceptual frame of reference, which rationalizes all influence networks that *appear* to affect the situation (the situational system observed from an outside and elevated vantage point). This frame systematizes the relationships of *all actors*, including your command, in the broader mission context, and makes it possible to propose and test a theory of how the situation emerged, and how it is likely to trend without intervention. It also aids in understanding the perspectives of higher authorities at least two levels up in the chain of command. (Conventional wisdom is to think at least two levels down when drawing up tactical plans and assigning subordinate tasks. Designing wisdom is to initially think two mission levels up to frame the problem context.¹¹) By comparing this systemic construct (based on what

¹⁰ This desired system is not an “end state” because the situation will continue to evolve. It is a state that meets the strategic desires of higher authorities, and can “self-regulate” or remain stable after the withdrawal of outside intervention. It is a cognitive model that will evolve over time along with changes in the command’s understanding. Its function is merely cognitive, to derive understanding about what changes are desirable, and what dynamics promote movement toward desired change, what dynamics oppose or retard it, etc.

¹¹ This is merely your author’s rule of thumb and should not bind the designer with a good reason to include higher levels perspectives as well. But it would be foolish, in this open world, not to disregard lines on a map to a certain extent. I consider two up a minimum.

is knowable from study and observation) with a desirable systemic construct (based on the conditions desired by higher authorities and *a better understanding of the situation*), it is possible to conclude what aspects of this system need to change to meet mission intent.

A conceptual map and written narrative can best describe and explain the command's understanding of the emergent situation. A map symbolizes relationships. The accompanying narrative notes relevant observations about the relationships and makes a relevant judgment about them individually and collectively. (For example, whereas facts a, b, and c are evident, therefore hypothesis x characterizes that relationship. Reasoning abductively¹² across all or several of the relationships yields new hypotheses about aggregations of relationships.) It will be useful to create multiple level maps of relationships. For instance, a map of the Taliban's relationship with other actors may be a starting point of a more extensive three level mapping. One system map would show how the Taliban fits into a system of local relationships astride the Afghan-Pakistan border area. This system of relationship could also be a component of a wider-system, and "Taliban" is also an aggregation of actors. Therefore a system of those relationships would be a third level mapping. If a recent system frame exists, the new one validates and adjusts previous maps and narratives. An initial system frame may be fairly sketchy but grows richer over time as learning occurs.

All people individually reason informally in similar fashion, consciously or not. But one rarely creates a detailed, collaborative, graphic, and narrative interpretation of the relevant actors and their relationships in an emergent situation. More rarely does anyone make an explicit record of theory, of influence networks, and of how a situation may evolve further if current strategy does not change. Even more unlikely is the event that an individual, much less a group, ever conducts a logical, comprehensive, and systemic enquiry suited to setting the problem (design) as opposed to solving one (tactical planning).

The exercise of creating, sharing, and periodically renewing such an explicit conceptual construct is an "official" reference and record of past assumptions of logic and provides a shared baseline for learning, and further critical thinking.

One aspect of this methodology assists the command with collaborative creative thinking. While it is relatively easy to identify the most apparent relationships based on the conventional or current way of looking at the situation, what is valuable, albeit more difficult, is to tease out relationships that exist outside the unthinking ways of thinking common to groups of people.

Meta-questioning is an intellectual habit that can help one escape conceptual paradigms to tease out relationships. For example, Afghans are members of a tribal society. A meta-question would ask, "How does being a tribal member affect the way Afghans view governance, international boundaries, drug trafficking, and support for the Taliban?" While doctrinal definitions,

¹² Abductive reasoning is to open systems what inductive reasoning is to closed systems – drawing a general hypothesis based on an assortment of observations or facts. Inducing from facts and observations within a closed mechanical system leads to greater certainty than does abducting from such evidence in an open system. For instance, it is impossible to prove conclusively that all swans are white, but it takes finding only one black swan in a population to falsify the hypothesis. This collaborative design inquiry requires us to proceed in our daily tactics on the basis that all swans are white *as long as we are on the lookout for swans of a different color. As soon as we find one we revise our hypothesis, and proceed on the new basis.*

categories, and patterns of behavior are useful for sharing understanding and organizing tactical efforts, they also confine one to current paradigms in thinking. Sound design requires one to critically test, break, and construct new and more relevant ways of understanding.

The next step of this stage is to create a mental model that defines the desired situation, and outlines the strategic logic for intervention, implied by higher-authority guidance *and* as modified by any new knowledge gained thus far in the enquiry. *The desired state is described in terms of changes in the system or its dynamics from one (the current) characteristic to another (that desired).* Model creation involves creating two models of the “observed” and “desired” states that can be juxtaposed to grasp the tensions between the two. Reflecting on these two frames of reference and the tension between them leads to recognition of what actors need to behave differently and what influence networks need to be altered, but not necessarily “how.” Jumping to conclusions about the how is a common tendency but should be avoided at this stage of understanding.

Stage 2 of Design: Formulating a Greater Causal Logic for the Intervention -- the Broader Theory of the Intervention (the Full Problem Frame and Strategy)

The second stage of design shapes thinking about action and how the situation can be transformed to the desired state considering *all practical forms of efficacy* (ability to produce results). Before the command can formulate the full logic for its own intervention it must understand the logic for the entire effort, inclusive of its own role. This is a necessary intermediate step. (The command does not presume to design for higher authorities, but this is a check of that design from another perspective, that of the command and its unique position in the larger system. Nothing but good can come of this effort, especially when the command’s understanding of the logic at the end of this stage differs from that of higher authorities or parallel collaborating partners. Resolving such differences should cause all to learn and adjust. Even when differences in understanding persist, attempting to resolve them enlightens the command of the thinking of its partners in the intervention. In the end the command adjusts to, *and compensates for*, the views and theories of its partners in the next stage of design.)

This stage of design produces a finer-grained appreciation of the tensions between the observed system and the desired one. It narrows the broader contextual perspective into the frame of reference that systematizes (forms into a system) the most relevant and useful influence networks, as well as systemic potentials, trends, and propensities, for transforming the contextual system into the desirable self-regulating system that would satisfy mission intent. It considers what is practical from multiple viewpoints. It formulates the greater logic for an intervention to transform the situational system as it is (or seems to be) into a system that would satisfy the desires of higher authorities and the broad intent of the mission. It develops a broad theory of action *inclusive* of the command’s role in the intervention in the context of collaborative “whole of government and alliance” efforts connected to a broader team of actors who are wholly or even partly in pursuit of the same outcomes.

This frame of reference, or systemic understanding, emerges from the previous one by systematizing at least three aspects of the situation. One is whatever stands in the way of change. Another is what and who promotes desired change. A third is how to bring to bear system-

changing means (will, resources, logistics, energy) at transformational leverage points. From this effort the command understands the broader strategy -- how it must cooperate with or support and enable outside agencies. Also, if this new understanding indicates a need to modify higher-level strategies, it provides the logical case for change.

The *system opposed to desired change* results from systematizing whatever actors and systemic trends, tendencies and propensities will oppose or stand in the way of desired system changes. Systemic changes (or disturbances) can produce an undesirable “emergence.” Combined, the source of the change and the emergence itself can be thought of as the “system of opposition.” This system may comprise actors in full or partial alliance, tendencies of particular allies, or the character and propensities of the environment. The next step is to give this opposed system more definition and use it as a foil to reflect on the path from the observed state of affairs to that desired. This step is analogous to Sun Tzu’s dictum to “Know your enemy” but more broadly applies to the milieu of opposition. The object is to understand as much as possible about environmental tendencies and propensities. That enquiry would involve wrestling with the asymmetries between the system of opposition and one’s command and allies as a system. A minimal enquiry into the system of opposition would address:

- How we can learn about it.
- The impacts of culture, politics, economics, and social dynamics on the opposing system’s behavior.
- The nature and structure of its “logistical” system.
- Its visible and invisible modes of operational maneuver.
- How this system of opposition might be disrupted.

The *system promoting desired change* results from systematizing the actors, alliances and systemic trends, tendencies and propensities that will work in favor of the desired system state. This creates a foil for reflecting on the asymmetries between the “system of opposition” and a system that hypothetically embodies all sources of potential resistance to it, specifically to the undesirable emergence. This step is analogous to Sun Tzu’s dictum to “Know yourself,” only more broadly applied to understanding oneself as a system, and oneself as a member of a “system of collaboration” toward compatible desired outcomes. This means pursuing answers to the following questions:

- How elements of this system can combine efforts of very different kinds of actors (for instance, relevant service elements, coalition contingents, non-military governmental agencies, indigenous organizations, multinational corporations, inter-governmental organizations and non-governmental organizations) to achieve *comparative advantage*?¹³
- How to create a networked system of collaboration to effectively engage and sustain these varied potentials throughout the campaign, and at the same time, share information and learn effectively about the ever-evolving situation?
- How to exploit the self-defeating habits and tendencies of particular adversaries, the inclinations and propensities of neutrals, and aspects or trends of the contextual environment that oppose the undesirable systemic emergence?

¹³ A comparative advantage is achieved when partners each contribute what they do best in a comparable rather than absolute sense. In this way the combination is most effective.

- How the command itself should organize to learn, adapt, and continually re-design throughout the campaign?

The *system of ways and means enabling change* results from systematizing how to bring to bear system-changing means at transformational leverage points. This aspect of the enquiry focuses on the tension between what is required and what is available to actors and agencies that can be mobilized, and on deciding major systemic logistical issues of positioning, staging, timing, and geography. The means required to change the situation may include the will and energy of allies to act, as well as various resources and military and non-military capabilities. This implies deciding on transformational leverage points, and creating a system for bringing means to bear in the most effective way -- the system for mobilizing, marshalling, delivering, and deploying the situation-changing means required to develop and sustain operations. Developing and sustaining the intervention will also require identifying and overcoming systemic impediments such as barriers of time, space, and geography.

Given the specific situation, other relevant systemic perspectives may also apply to further limit, scope, and shape the form of the intervention. And each of these expands understanding relevant to the mission, leads to more revisions of the cognitive map and narrative record of the design enquiry, and further outlines and limits the scope and form of the intervention.

And thus is created the frame of reference that actually shapes our thinking about the distinct objectives that need to be pursued to transform the observed system into the desired situation, who needs to lead and support in the pursuit of them, what trends and propensities in the situation can be facilitated, and which ones need countering, and where and how to apply positive and negative energy to the various influence networks within the system.

Putting this into words and pictures is framing the broader theory of the intervention, and formulating the greater logic for the intervention – in other words, formulating the strategy *for all relevant forms of efficacy* to transform the system. (Strategy in its original sense is the central and unique idea for exploiting the peculiar characteristics of any complex situation to achieve desired outcomes. In this sense strategy is not a level of war. It is the product of design, just as tactics are the product of planning. It is design that formulates the causal logic central to strategy. Tactics is about optimizing a given causal logic. It is design that conceives of the system of opposition and gives shape to its nature and tendencies, and it is design that gives form to the asymmetries between the system of opposition and the system promoting desired change. And it is the design enquiry that uncovers systemic propensities that can be leveraged. Strategy is the product of design at any level of an organization that deals with complexity.)

What remains for the next stage is to narrow a broad theory of intervention down to the role of the command itself: for instance, where it will support, where it will lead and be supported, and how it will apply systemic leverage -- the command's own unique *strategy*.

Stage 3: Formulating the Logic for the Command's Own Intervention

The third stage of design settles on the commander's *explicit formulation* of the way the mission world is *assumed* to function and of how to exploit the potential for positive change within it. It

shapes thinking about the command's own actions and learning as it plays its role in transforming the undesirable situation into the desired state. It is formulating the logic for the command's intervention into the complex mission environment. It is the commander's provisional conceptual guidance for immediate tactical planning, learning and action.

This stage of design produces an even finer grained appreciation of the tensions between the observed system and the desired one that are most relevant to the command's own mission. It narrows the previous collaborative perspective above the command into the frame of reference that systematizes the influence networks, as well as systemic potentials, trends, and propensities *most relevant and useful to the command's role* for satisfying mission intent. It considers what is practical from the command's viewpoint.

The logic for the command's own intervention emerges from the construction of the "system" into which the command itself will intervene. From this systemic frame emerges the concept of the command's "mission-problem" and a theory of how the command contributes to systemic transformation, and equally important, a theory of how the command can learn not only "how to do things right" but whether it is "doing the right thing." And from this flows the commander's appreciation and his mission strategy. This comprises the tactical planning guidance for the command.

The *commander's appreciation* that summarizes, using a combination of brief written narrative and logical mapping, the products of stage 1 and 2 of design. (A brief theory of the situation that describes and explains the inner forces that influence systemic change. And a brief theory that describes and explains how the situation can be transformed to the desired state from a "whole of governments" perspective, *inclusive* of the command's role in the intervention.)

The *commander's intervention or mission strategy* is the central and unique idea for exploiting the potential for positive change in the mission situation. For instance: the peculiar characteristics of the situation; the nature and tendencies of the system of opposition; the asymmetries between the system of opposition and the system of collaboration; and other systemic propensities. A statement of the intervention strategy could address: what broad sequential and parallel goals *the command* will pursue by what logic; how it will organize to pursue them; how it will work "by, with, and through" others; how it will learn to make progress; how it will know to re-design; and what messages must this intervention send to relevant publics.

Complex missions always lead to the pursuit of multiple goals in sequence and parallel. Useful mission goals identify desired systemic relationships among specific groups of people within the mission context.

Mission strategies also identify explicit sub-strategies for exploiting the potential for positive change along each goal-oriented line of effort. A complete design inquiry will have exposed these.

The value of alliances with others beyond the command toward these goals is enhanced through well-thought out organizing strategies. Understanding what we can expect of both formal and informal allies is an important aspect of mission strategies.

Sound mission strategies also exploit the potential for learning and adapting along every line of effort, and over all. Developing strategic ideas about how learn and adapt collectively with collaborating team members in the mission environment will be as important as learning how to make immediate progress.

Mission strategies also require strategies for exploiting the potential for identifying, mobilizing and deploying the resources of will, energy, and capabilities within the mission-situation.

A final strategic component is formulating the overall message the pursuit of the mission intends – summing all actions, images, and verbal communications. This is as much an internal control mechanism to align all words and deeds of the command as it is a theme for messaging to relevant external publics. This is recognizing that what we say influences far less than what we do.

Conveying the Product of Design



There is no formulaic way of presenting the product of design, but the better the design inquiry the more easily abstract concepts translate into brief, clear and concise language and graphics with a logical flow of ideas. They need to explain no more than the logic *unique to this situation* that planners should assume *to exploit the potential for positive change*. The design of the moment sets (or frames) the current mission problem for near term tactical actions only. And it should be clear that this guidance is contingent on the command's current understanding of the situation, and subject to change based on unpredictable evolutions in the situation and on command level learning.

Issues of Design at Multiple Levels

The same logical sequence applies to the design efforts of subordinate leaders as they pursue assigned goals and lines of effort intended to wield various kinds of power to influence the decisions, intentions, beliefs and actions of groups of humans in the mission context.

Although design enquiries of higher and lower echelons will overlap, they do not duplicate. When the next higher authority applies the same or similar systemic approach to design as shown here, the design work of the lower headquarters may go more quickly. It will be normal for problem framing at one level of design to differ from that of a higher or subordinate authority. But different echelons have different perspectives and see their world at different levels of granularity. And different subordinates will face different human situations and will need to exploit the potential for change that they find in their unique mission situations. Differences may also result from considering different sets of facts and different interpretations of the same facts. And different causal assumptions can lead to different mission-problem framing. The commander's decision of problem formulation should not gloss over such differences with compromises, as these differences can become the basis for framing priority questions that could falsify the reigning mission hypothesis. And that's a good thing!

Higher commanders must expect and respect these differences. They should try to understand the implications of these differences at their own level, and ask critical questions of their subordinates. Subordinates should treat the understandings of their higher headquarters as a valued reference, but with professional skepticism. When subordinate commands feel free to challenge the understanding of their higher authorities, based on their own comprehensive design enquiries, both headquarters benefit. Continually addressing the differences in understandings, up and down as well as laterally within a large campaigning formation is healthy, and speeds learning and adaptation. Simply developing a lowest common denominator compromise is unhealthy and slows learning and adaptation. In fact, a "mission command" philosophy of command that defines intent broadly enough to not only allow subordinates the freedom to solve problems independently, but also encourages them to re-frame mission-problems expeditiously, even when they re-frame more quickly than their superiors. A command that continually addresses differences in understanding will maintain unity of effort and coherence while learning and adapting more rapidly.

This journey of learning is continuous, iterative, and reflective because whatever strategy is applied in the real world, the mental models constructed along this journey are only imperfect representations of it. The process of design inquiry doesn't stop. The processes of combined *abductive*, *deductive*, and *inductive* inference continually tests the reigning hypothesis upon which current tactical actions are based to falsify and reconstruct it. Abduction generates a *possible* new hypothesis to account for a surprising phenomenon. Deduction clarifies the relevant *necessary* predictive consequences of the hypothesis. And induction generalizes from the prediction to test the hypothesis.

New constructs must account for new observations and new desired system states. New tensions between observed and desired states need to be reconciled. Enriched understanding then needs to

translate into strategic and tactical adaptations and reformed intervention. Periodically new design guidance will flow to subordinates and tactical planners while the command team continues to learn.

When we do all of this well enough, designs evolve at multiple echelons within a greater continuous collective and collaborative process for testing and transforming *what we collectively think we know into newer more applicable and situation-tailored wisdom*. And from this, effective collective adaptation follows.

Huba Wass de Czege is a retired U.S. Army brigadier general. During his career as an infantry officer, he served two tours in Vietnam and gained staff experience at all levels up to assistant division commander. General Wass De Czege was a principal designer of the operational concept known as AirLand Battle. He also was the founder and first director of the Army's School for Advanced Military Studies where he also taught applied military strategy. After retiring in 1993, General Wass De Czege became heavily involved in the Army After Next Project and served on several Defense Advanced Research Projects Agency v advisory panels. He is a 1964 graduate of the U.S. Military Academy and holds an MPA from Harvard University.

This is a single article excerpt of material published in [Small Wars Journal](#).

Published by and COPYRIGHT © 2010, Small Wars Foundation.

Permission is granted to print single copies for personal, non-commercial use. Select non-commercial use is licensed via a Creative Commons BY-NC-SA 3.0 license and per our [Terms of Use](#). We are in this together.



No FACTUAL STATEMENT should be relied upon without further investigation on your part sufficient to satisfy you in your independent judgment that it is true.

Contact: comment@smallwarsjournal.com

Visit www.smallwarsjournal.com

Cover Price: Your call. [Support SWJ here.](#)