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FUTURE WAR

Understanding Systems Theory for U.S. Marines

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Executive Summary

Title: Understanding Systems Theory for U.S. Marines

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Thesis: In the future, it will be necessary for all Marines to apply systems theory.

Discussion: War has always been complex. However, contemporary complexity is accelerating toward increasing future complexity. On this basis, this paper argues that in the future Marines of all ranks will require a fundamental understanding of systems theory in order to operate in the accelerating complexity of the future. Toward this end, this paper explains complexity in three layers: dynamic complexity, generative complexity and social complexity. Dynamic complexity is a function of structure and inter-relations. More structure and more relationships result in complexity that is more dynamic. As energy and matter pass through the nodes and links, dynamic complexity separates cause and effect across time and space. This distance between cause and effect is the mark of dynamic complexity. Generative complexity describes the dynamic relationship between problem and solution. Social complexity describes the complexity arising from differences in the ways people think as a function of culture, language, history, etc. In each case, appendices and links to downloadable software provide practical tools.

Conclusion: Accelerating complexity in the operational battlespace clearly implies a need for Marines to increase capacity to design, plan and operate in the ever more chaotic future warfighting environment.

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Prologue

[W]henver we propose a solution to a problem, we ought to try as hard as we can to overthrow our solution, rather than defend it. Few of us, unfortunately, practice this precept; but other people, fortunately, will supply the criticism for us if we fail to supply it ourselves. Yet criticism will be fruitful only if we state our problem as clearly as we can and put our solution in a sufficiently definite form—a form in which it can be critically discussed.

—Karl Popper, *The Logic of Scientific Discovery*

To comprehend and cope with our environment we develop mental patterns or concepts of meaning. ... [W]e destroy and create these patterns to permit us to both shape and be shaped by a changing environment. ... [W]e cannot avoid this kind of activity if we intend to survive on our own terms.

—John R. Boyd, “Destruction and Creation”

Countless duels go to make up a war, but a picture of it as a whole can be formed by imagining a pair of wrestlers. Each tries through physical force to compel the other to do his will.

Clausewitz, *On War*, p. 75

Although our intellect always feels itself urged towards clearness and certainty, still our mind often feels itself attracted by uncertainty.

Clausewitz, *On War*, Book 1, Chapter 1, p. 86.

We have trained our imaginations to be fundamentally linear.

Beyerchen, *Clausewitz, Nonlinearity, and the Unpredictability of War*, p 86

When we look at the present to learn of trends that shape the future, we often ask, “what is changing?” Instead, to see where change is going, we must examine the second derivative. “What is the rate of change of the change?” So, what is changing? More actors on the world’s stage, globalization, interconnectedness, global crime and terror networks, increasing religious tension and the list goes on. What is happening to the rate of change? These and other important variables are changing more rapidly; moving toward greater complexity in the future. Warfare has always been complex, is more complex, and is growing more complex at an increasing rate. In the future, a warrior’s capacity to think through vastly accelerating complexity will be an increasingly decisive and necessary element of success.

Understanding Systems Theory for U.S. Marines

As part of our philosophy of command, we must recognize that war is inherently disorderly, uncertain, dynamic, and dominated by friction. Moreover, maneuver warfare, with its emphasis on speed and initiative, is by nature a particularly disorderly style of war. The conditions ripe for exploitation are normally also very disorderly. For commanders to try to gain certainty as a basis for actions, maintain positive control of events at all times, or dictate events to fit their plans is to deny the nature of war. We must therefore be prepared to cope—even better, to *thrive*—in an environment of chaos, uncertainty, constant change, and friction. If we can come to terms with those conditions and thereby limit their debilitating effects, we can use them as a weapon against a foe who does not cope as well.

MCDP-1, Warfighting p.80

1. Thesis. In the future, it will be necessary for all Marines to apply systems theory.

2. Introduction. Warfare has always been complex. Currently, warfare is growing more complex, and the rate of this change is increasing. If this trend continues, then future war shall be exponentially more complex. Military units and individuals most capable of dealing with the extreme complexity of the future battlefield will gain a decisive and necessary advantage. Systems theory defines, describes, and explains complexity. Systems practices include terms, tools, and ways of thinking: practical applications of systems theory. In the future, proficiency with these tools, practices, and ways of thinking will be as universally necessary as small arms proficiency is today.

2. Fundamentals of Systems Theory: Systems Thinking. The systems approach to thinking begins by recognizing that anything that includes two or more related elements is a system.¹ Thus, a scissors is a system. A hand grenade is a system. An individual human being is a system. A group of human beings is a system. If the whole thing has more than one related element, then the whole thing is a system. Systems are connected to their environment: a hand grenade in a Marine's hand. Systems receive input, conduct a process, and generate output. The hand grenade receives input: thumb clip, pull pin, throw grenade; it lands. The hand grenade's process: the spoon releases, the fuse burns, and ignites the explosive charge. This generates

output: an explosion, then motion in the form of fragments accelerating in all directions.

Systems include related elements, inputs, process, and outputs.

Some systems include more elements than other systems, and this increases complexity. A system that includes more elements is more complex; specifically, the more elements within a system, the greater its structural complexity. Thus, both a scissors and a rifle are structurally complex; the rifle is more *structurally complex* than the scissors. All systems, by definition, include more than one related element and are thus, more or less structurally complex. Even some so-called ‘simple machines’ (i.e., shovel, lever, etc.) are in fact structurally complex. A lever is more structurally complex than a shovel; a wedge is less complex than either a shovel or a lever. However, structural complexity involves more than just the number of elements in the system. A box of machine gun ammunition has hundreds of parts, and is structurally complex. A truckload of machine gun ammunition may multiply the number of parts, but the complexity does not really increase. A handheld global positioning system (GPS) receiver is more structurally complex than a truckload of machine gun ammunition. The quantity of elements within a system is merely part of structural complexity. The extent to which the elements are different from one another, their species, also contributes to structural complexity.

Structural complexity has layers. Nearly all systems are composed of subordinate elements that are also systems. A vehicle includes an electrical system, brake system and so on. Biological systems include cells, organs, internal systems (circulatory, skeletal, digestive, respiratory, etc.), and organisms, groups of organisms, and even entire societies and ecosystems. Biological systems seen through this lens illustrate structural complexity; often referred to as a system of systems.

4. Dynamic Complexity. Systems and their subordinate elements interact with one another and generate dynamic complexity when they pass or exchange information, energy, or matter.² As information, matter, and energy pass through the system, behavior changes. The precise cause of any particular behavioral change can be difficult or impossible to observe directly. Cause and effect are difficult to determine. Dynamic complexity arises from interconnectedness: internal connections and external connections. A group of Marines interconnected by means of a radio network is a dynamically complex system. If these Marines communicate by means of snail mail, then the time delay increases the dynamic complexity. A fire team, a squad, a platoon: each is dynamically complex. A platoon is more dynamically complex (and slightly more structurally complex) than a squad. Further, within a platoon of thirty Marines, the Marines are closely related. Thirty Marines standing in the chow line are less closely related; thus, the thirty in the platoon are more dynamically complex. Dynamic complexity is a function of the qualities of the interaction, or relationships (e.g., How close, strong, capable are the connections?), and the quantity of those relationships (e.g., How many connections are there?). More interconnectedness (quality and quantity) that is more widely disbursed increases the distance in time and space between cause and effect, and generates more *dynamic complexity*.

Dynamically complex systems often demonstrate the capacity to change or adapt, such systems are adaptive; thus complex, adaptive systems.³ The ability to adapt stems from the capacity to change structure or relationships – internal or external. For example, during a fire fight opposing units fire on one another to change the structure of their targets by destroying or wounding their enemies; they maneuver to change their relative positions. They adapt. If a system’s structural complexity (think ‘parts or elements’) or dynamic complexity (think ‘connections and relationships’) has the capacity to change, then the system is adaptive.

Sometimes, adaptation changes the essence of the system or systems. When a truck platoon joins a rifle company, an entirely new unit is created: a motorized infantry company. When complex, adaptive systems change structure or relationships, the behavior of the entire system usually changes. The whole effect of these new creations is difficult to predict beforehand. The motorized infantry company behaves very differently from either the rifle company or the truck platoon. Adaptation has the potential to create an entirely new unit, with entirely new behaviors. Dynamic complexity enables and facilitates adaptation, changes in systemic structure or relationships. Many systems have the capacity to adapt by changing internal or external relationships, structure, or both. These are complex, adaptive systems.

A system's structure - structural complexity - may enable adaptation. Conversely, some systemic structures resist adaptation. Pyramid-shaped structures, like the chain of command, tend to resist adaptation. Consider a system that lacks hierarchy: an internet chat room. A spider's web extending in all directions can depict such a system, without any center, up or down. Such a system has no 'center of gravity'; instead, its structure is distributed. Distributed Operations are one military application of this idea. The distributed structure of criminal networks, insurgents, and terrorists further illustrate. While hierarchy tends to resist change, distributed structures tend to resist stability; they change rapidly. Information moves rapidly across distributed systems, not up or down the reporting chain; there is no 'up' or 'down'. Operating within a highly distributed structure allows a system to rapidly change, or adapt, any number of their characteristics; this includes means, ways, and ends.⁴ New creations abound. These adaptations are not necessarily centrally directed; in fact, usually they are local responses to local conditions.⁵ Yet, the consequences of these new behaviors can, and generally do, reverberate beyond the locality and extend across the system.

One must consider the whole of war before its components.

Gerhard Scharnhorst

This is the crux of dynamic complexity: time, space, or both separate cause and effect. A given cause produces effects that become apparent much later in time – if ever - and in far away places. Consider a familiar and dynamically complex system, the weather.⁶ The behavior of these complex systems is inherently difficult to predict.⁷ Increasing complexity generates increasing uncertainty: a lack of sureness, conviction or knowledge, especially about an outcome or result.⁸ The search for cause and effect relationships is difficult because cause and effect are often separated. Action in Place A causes effects far way in Place Z. Outputs observed now are the result of inputs and process executed some time ago. Often small causes produce very large effects. For example, if a key Marine in a company is replaced (i.e., CO, XO, 1stSgt, Co GySgt, Police Sgt, Radio Operator, etc), then the old company may no longer exist, a whole new company has been created. **In order to understand cause and effect, one must understand the whole system**: structure, interconnectedness, adaptation, input, process, and output. Very detailed understanding of a part of the system is not likely to explain the behavior of the whole system. Separation between cause and effect is the essence of dynamic complexity.

In the future, Marines will need tools to deal with the ever-more dynamically complex operating environment. Systems thinking is the first tool. “Our theories determine what we measure,” Albert Einstein. As we train our minds to understand how structure and interconnectedness influence behavior, we look, see, and think differently.

We have a language for tactics; likewise, systems thinking has a language. There are a handful of common systems, called ‘archetypes’. These archetypes are named for their apparent behavior: Escalation, Fixes that Fail, Limits to Success, and others. Appendix A is a pocket

guide that explains eight of the most-common archetypes. The archetypes are generic forms that Marines can modify to model more accurately their actual situation.

Models are tools that allow Marines to assemble and communicate ideas to fellow Marines. As Marines observe causes and effects in the area where they operate as a team, squad, platoon, or company, they begin to develop an intuitive understanding of cause and effect that was not possible before. This understanding is valuable, priceless, and vital to success, but is difficult to communicate. To map relationships between causes and effects, through the elements and connections within systems and systems of systems, is to build a model that improves understanding of the situation. Appendix B, a Pocket Guide to Causal Loop Diagrams includes symbols and terms useful for this purpose. Higher-level staffs with access to computers can certainly benefit from complex, adaptive modeling software. Harvard and the Massachusetts Institute of Technology (MIT) use VENSIM, available free here:

<http://www.vensim.com/software.html>.

Models are useful, but have some clear limits. No model is truly accurate. The behavior of complex systems is inherently unpredictable. When great sacrifice has gone into developing a useful model there is a temptation to believe that this model is truly accurate, and so we can predict and control the behavior of the complex system we have modeled. This is hubris, profound error.⁹ Systems thinking humbly acknowledges that complex systems are inherently unpredictable and precision control is not possible.¹⁰

5. Generative Complexity: When a problem and a solution are wrestling each other.

The essential difference is that war is not an exercise of the will directed at inanimate matter, as is the case with mechanical arts.... In war, the will is directed at an animate object that reacts.

Clausewitz, *On War*, p. 149.

..., and the process of interaction results.... The very nature of the interaction is bound to make it unpredictable.

Clausewitz, *On War*, p. 139.

Generative complexity describes a dynamic relationship between a problem and a solution. If the problem will stand still and allow Marines to operate on it, like a patient on a stretcher before a surgeon, then understanding dynamic complexity may be sufficient. However, if the patient is actively participating in the surgery, helping, or worse, opposing the surgeon, then this reveals a new layer of complexity. The essence of war, and warfighting, is **generative complexity**. The problem and the solution are interacting, like two wrestlers. Today's **generatively complex problems** are often unexpected consequences of yesterday's solutions. As Marines implement solutions adversaries, rivals, partners and allies adapt. These adaptations create new structure, connections, and behaviors that change the problem; meanwhile Marines operate. Generative complexity exists when a problem and a solution are interconnected, interacting, even interdependent, and systems thinking provides useful tools.

The complexity of insurgency presents problems that have incomplete, contradictory, and changing requirements. The solutions to these intensely challenging and complex problems are often difficult to recognize as such because of complex interdependencies. While attempting to solve an intensely complex problem, the solution of one of its aspects may reveal or create another, even more complex, problem. The purpose of design is to achieve a greater understanding, a proposed solution based on that understanding, and a means to learn and adapt.

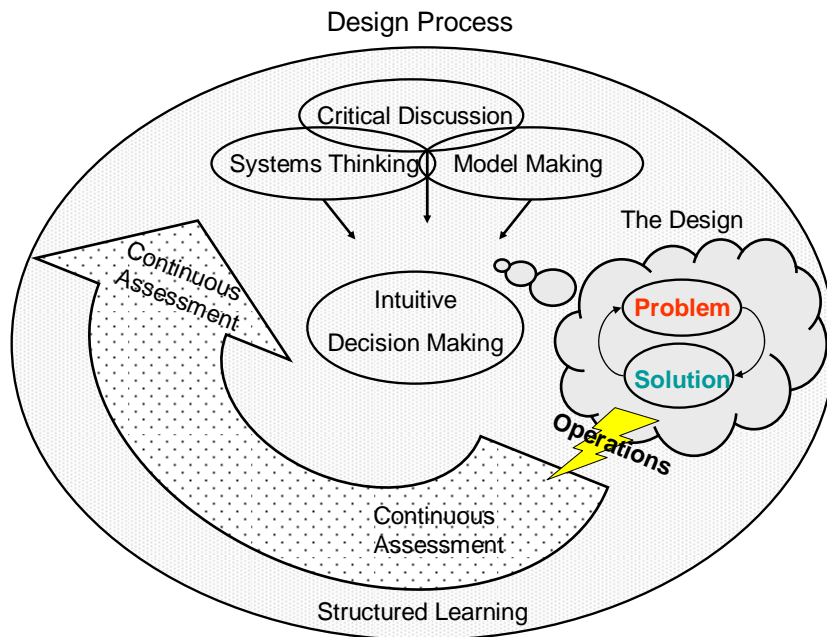
MCWP 3-33.5, COUNTERINSURGENCY, p.4-1

In the future, Marines will face problems that are more structurally, dynamically, or generatively complex. Design is a tool for dealing with complex problems, especially generatively complex problems. MCWP 3-33.5, Counterinsurgency, dated 15 December 2006 has much to offer. Chapter 4, Designing Counterinsurgency Campaigns and Operations speaks directly to this issue (attached as Appendix C).

Developing solutions requires understanding the problem(s). In complex situations, some behavior of the target system may be observable, but the cause or causes of that behavior will probably be hidden from view, impossible to observe directly. Without understanding the problem, planning a solution is futile. Increasing complexity makes this challenge more and more significant and increases the importance of design as a way to build understanding of the problem with a view toward planning operations aimed at changing the target system's behavior from unsatisfactory to satisfactory. If planning is to lead to effective action, then design is an essential precursor to planning.

Design is a process that addresses the requirement to see and understand in sufficient depth and breadth with application at all levels in the chain of command. Successful design demands more of communications skills and creativity.¹¹ Well-reasoned, critical discussion allows Marines and a wider variety of subject matter experts to share their observations, builds and extends common understanding, and leverages the collective intelligence of the whole unit.¹² Systems thinking provides vocabulary necessary for critical discussion. Models visually depict the developing understanding of the problem and its relationship with the emerging solution. By building understanding of the problem, solutions become apparent. This is especially true of people who are most able to retain a sense of the whole generatively complex system comprised of the problem and the solution. Our most experienced leaders are often the people who are best

equipped for this intuitive decision making process. As leaders gain an understanding of the problem, solutions based on that understanding become apparent. Operations test this understanding, to find the errors in the reasoning that seeks to explain the behavior, interconnectedness, and structure of our adversaries and rivals. Careful observation of the effects of operations provides feedback, through a continuous assessment process that re-informs our understanding, and the process begins again with critical discussion. This process is repeated continuously, until the target system changes to a satisfactory state in terms of behavior, interconnectedness, and structure. When all levels in the chain of command fully understand this process, it is extremely powerful. “While campaign design is most often associated with joint force commanders, all commanders and staffs need to understand it,” MCWP 3-33.5, Counterinsurgency, page 4-1.



Adapted from MCWP 3-33.5, Chapter 4, Designing Counterinsurgency Campaigns and Operations

Design leads to a cultural shift away from a mindset that assumes a high degree of certainty with respect to the problem and associated solution, and acknowledges the inherent unpredictability of events within generatively complex systems. Some problems are solved best through an engineering approach while other problems simply are not. The difference is critical. When the essence of the problem is easy to see, familiar (i.e., cross a bridge or a river, build a road, seize a fortified position), then the engineering approach to problem solving is applicable.¹³ If the essence of the problem is difficult to see, unfamiliar or unique, often the elements of the problem are alive, animate entities such as social, religious, or political groups, then the fog of dynamic and generative complexity obscures the essence of the problem beyond the reach of solutions that are merely well engineered.

When Marines operate within generative complexity, initial understanding of the overall system, including the target system, is merely a straw man represented by a model. There is no presumption of certainty in terms of understanding the complexities. Rather, the presumption is one of uncertainty; we don't know for sure. We observe, think, propose explanations, and operate to find the flaws in our explanations. Operations, by design and through execution, are experiments that test hypotheses. Through the process of conducting operations, the model becomes more accurate, a more useful aid to decision making and operational action.¹⁴ Nevertheless, our understanding will always be somewhat incomplete. Rather than an engineered solution, operations evolve as we adapt responsively to the target system adapting to us.¹⁵ This iterative process of learning through operations progressively interacts with the target system(s) to induce the target system to change through adaptation toward a satisfactory state. The precise form of that satisfactory state is unpredictable. The exact amount of time that this

process will consume is unknown. The goal is to bring about change in the target system to a satisfactory state through a dynamic, interactive process of learning through operations.

The ways to realize this goal, to achieve success, can take many forms. Transformation of an adversary whose principle means of action is a conventional military may be realized through the destruction, or neutralization, of that conventional force. A nation overwhelmed by the effects of a natural disaster, epidemic, or economic crisis may be transformed by integrating the population and the government to form a cohesive and functioning entity capable of operating within its context. While a particular pathway may be desirable from our point of view, whether it will produce a satisfactory result with respect to the target system depends primarily on the dynamics of that system. Not all systems are susceptible to transformation. Some systems are very stable. They demonstrate an inherent capacity to absorb huge amounts of energy, matter, or information without any real change. Destruction, if practical, may be the only way to transform such systems. Other systems are highly responsive.¹⁶ Target systems, and the context within which they exist, tend to be unique. Likewise, the precise pathway that leads to transformation of a generatively complex system toward a satisfactory state is unique, hence unpredictable.¹⁷ Solutions are worked out as the situation unfolds.¹⁸

6. Social Complexity. In an increasingly complex world people are another layer of complexity. There are characteristics of people, and groups of people, that make human beings different from all other elements of systems. Complex systems that include human beings are *socially complex*.

People think, have goals, attitudes, values, and beliefs. If all people thought in exactly the same way then *social complexity* would not be significant. However, many groups of people think in ways that are very different. Marines value honor, courage, and commitment. America

might cite liberty and justice. Different groups often cite different values; some values are common to many groups. Fidel Castro might cite liberty and justice with the same zeal as Americans pledging allegiance to the flag. Evidently, the same words have very different meaning to these two groups of people. Often, the differences in the ways groups of people think are the differences that distinguish the groups. The behavior of people, and groups of people, is influenced by what people think, value, and believe, and these differences generate *social complexity*.

Social complexity is layered over dynamic and generative complexity. Differences in ways of thinking make it more difficult to understand what groups of people are doing and why they are doing it. Cause and effect are more difficult to connect. We understand dynamic complexity by understanding the structures, relationships, inputs, processes, and outputs of dynamically complex systems. To understand social complexity we have to penetrate through those layers, to the layers of thinking, values, and beliefs. Lately, many Marines have been reading histories of the Arab world, Islam, and especially Iraq. This is an effort to come to grips with social complexity. Future generations of Marines will find that these insights are even more important.

Relative weakness is a powerful engine for adaptation. Contemporary insurgents employ processes that often confound conventional forces. Often, insurgents operate where they enjoy significantly greater understanding of the vital population's language, culture, etc. Insurgents have demonstrated the ability to leverage social complexity to gain a competitive advantage. While no one knows what early-21st century insurgent process will become; we can say that they are likely to adapt in unexpected ways to further improve their social complexity leverage.

Building our capacity to deal with social complexity is an adaptation that is necessary now, and more so in future war.

In the past, we have been able to think about our enemy by thinking about ourselves. If our enemy's dynamic complexity (structure, interconnectedness, behavior) is essentially the same as ours, then we have a model of our adversary; that model is us, a mirror image. In the past, the adversaries against whom we have achieved an overall satisfactory outcome generally shared more than mere dynamically complex similarity; often they shared important elements of our own cultural heritage and as well as the nation-state construct. This is a socially complex similarity. When strategic, operational, and tactical leaders are able to satisfactorily understand the thinking of their adversaries, outcomes tend to be satisfactory. When social complexity confounds such understanding, as in Asia, the Middle East, Africa, and increasingly Latin America satisfactory outcomes prove more elusive.¹⁹

Our adversaries' ways of thinking are increasingly not the same as our own. Admonishments to 'turn the map around' and 'think like the enemy' have become hollow platitudes, which offer no useful insight. In fact, such thinking is increasingly erroneous and misleading. While once we heard, "turn the map around", now we hear, "don't mirror-image". A distinguishing characteristic of contemporary warfare is our inherent incapacity to assess and comprehend satisfactorily our adversaries' ways of thinking, changing goals, and behavior. Consequently, we are unable to predict their behavior. Furthermore, we often find that we cannot even understand or explain their behavior after the fact. Naturally, it follows that we are less able to understand how we can best influence their behavior.

If future adversaries adapt to increase their existing social complexity advantages, then the need to build our capacity to deal with social complexity can only increase. A Marine on

patrol trying to communicate with a person whose thinking is alien to his own is facing social complexity. When people think differently, communication is difficult. Systems thinking offers tools to deal with social complexity. Two tools are offered here. First Appendix D, a Pocket Guide for Dialogue, is useful for all people at all levels. If the goal is to build understanding of a complex problem, then communication through constructive dialogue is a proven way ahead.

Additional tools are available to higher-level commanders and their staffs. In the civilian world, social complexity manifests itself in the inner dynamics of businesses and their staffs. The military analog is our staffs, especially Operational Planning Teams. When Marines find it necessary to make our own reasoning perfectly clear, or conversely to understand the reasoning of a person whose thinking is difficult for us to understand, then systems thinking practiced through constructive dialogue, is powerful.

Interagency and international operations are the norm.²⁰ A common body of theory, applicable to all professions and nations, enables all participants to contribute more fully.²¹ Civilian organizations have found great utility in a systems thinking tool called Dialogue Mapping. This tool uses fairly simple software to make reasoning explicit. CogNexus Institute's software, Compendium is available free here: <http://www.cognexus.org/id66.htm>. A systems view of the environment is a foundation for the internal integration of our own staffs, and external integration with allies and multinational partners.

7. Conclusion. The strategic, operational, and tactical operating environments are growing more complex.²² Groups of people are increasingly connected, inter-acting, and integrated.²³ First, this is a function of the growing number of actors -- state and non-state, national and trans-national -- with power to act. In 1900, the world included 43 nations; by 1939, there were more than 60. In 2000, the United Nations listed 192 member-nations.²⁴ Secondly, increasing inter-

connectedness of people and groups of people throughout the world creates networks that further expand the extent and intensity of complexity. Rivals and allies demonstrate the ability to adapt rapidly to new challenges and opportunities.²⁵ The warfighting environment is growing more complex, and the rate of this change is accelerating.

Increasing complexity requires Marines to increase our ability to operate in uncertainty.²⁶ Systems thinking provides processes and tools that enable Marines to see structure and interconnectedness. Modeling, even simple sketches, vastly multiplies our capacity to make sense out of what we see, to build understanding. The best understanding can explain how systems operate, the kinds of things they can, and probably will do. However, complexity -- the true 'fog of war' -- will always conceal important facts. Our models are never fully accurate. Complex systems can be influenced, but the capacity for adaptation eludes prediction and control.²⁷ Systems thinking does not suggest that we can completely understand, control, or predict the complexity of the current or future warfighting environment through modeling, hypothesis, or operational experimentation.²⁸ Good thinking leads to better understanding; but even our best understanding remains less than complete.²⁹ Systems dominated by human beings are inherently unpredictable.³⁰ This is no quest for certainty. Systems thinking explicitly refutes the illusory quest to control that which cannot be controlled. Rather, we develop ideas and test them through operations to disprove and discard some while developing and improving others. In the future, operations serve two purposes: first, to build the understanding necessary for effective operations and second, through operations that actually affect the target system, influence the target system's adaptation to an acceptable state. In the future, it will be necessary for all Marines to understand and apply systems theory.

Appendix A: A Pocket Guide to Using the Archetypes



A Pocket Guide to Using the Archetypes

by Daniel H. Kim and Colleen P. Lannon

Archetype/Application	Intervention Guidelines	Illustration
<p>DRIFTING GOALS Application: Staying Focused on Vision Various pressures can often take our attention away from what we are trying to achieve. The "Drifting Goals" archetype helps explain why an organization is not able to achieve its desired goals. Used as a diagnostic tool, it can target drifting performance areas and help organizations attain their visions.</p>	<ol style="list-style-type: none"> 1. Identify drifting performance measure. 2. Look for goals that conflict with the stated goal. 3. Identify standard procedures for closing the gap. Are they inadvertently contributing to the goal slippage? 4. Examine the past history of the goal. Have the goals themselves been lowered over time? 5. Anchor the goal to an external reference. 6. Clarify a compelling vision that will involve everyone. 7. Create a clear transition plan. Explore what it will take to achieve the vision, and establish a realistic timeline. 	<p>DRIFTING QUALITY STANDARDS</p>
<p>ESCALATION Application: Managing Competition One of the reasons we get caught in escalation dynamics may stem from our view of competition. The "Escalation" archetype suggests that cutthroat competition serves no one well in the long run. The archetype provides a way to identify escalation structures at work and shows how to break out of them or avoid them altogether.</p>	<ol style="list-style-type: none"> 1. Identify the competitive variable. Is a single variable the basis of differentiation between competitors? 2. Name the key players caught in the dynamic. 3. Map what is being threatened. Are your company's actions addressing the real threat, or simply preserving core values that may no longer be relevant? 4. Reevaluate competitive measure. Can the variable that is the foundation of the game (price, quality, etc.) be shifted? 5. Quantify significant delays that may be distorting the nature of the threat. 6. Identify a larger goal encompassing both parties' goals. 7. Avoid future "Escalation" traps by creating a system of collaborative competition. 	<p>ESCALATING FREQUENT FLYER PROMOTIONS</p>
<p>FIXES THAT FAIL Application: Problem-Solving Almost any decision carries long-term and short-term consequences, and the two are often diametrically opposed. The "Fixes That Fail" archetype can help you get off the problem-solving treadmill by identifying fixes that may be doing more harm than good.</p>	<ol style="list-style-type: none"> 1. Identify problem symptom. 2. Map current interventions and how they were expected to rectify the problem. 3. Map unintended consequences of the interventions. 4. Identify fundamental causes of the problem. 5. Find connections between both sets of loops. Are the fixes and the fundamental causes linked? 6. Identify high-leverage interventions. Add or break links in the diagram to create structural interventions. 7. Map potential side-effects for each intervention in order to be prepared for them (or to avoid them altogether). 	<p>FIXES FOR FALLING SALES</p>
<p>GROWTH AND UNDERINVESTMENT Application: Capital Planning If demand outstrips capacity, performance can suffer and hurt demand. If this dynamic is not recognized, the decrease in demand can then be used as a reason not to invest in the needed capacity. "Growth and Underinvestment" can be used to ensure that investment decisions are viewed from a fresh perspective, rather than relying on past decisions.</p>	<ol style="list-style-type: none"> 1. Identify interlocked patterns of behavior between capacity investments and performance measures. 2. Identify delays between when performance falls and when additional capacity comes on-line—particularly perceptual delays regarding the need to invest. 3. Quantify and minimize acquisition delays. 4. Identify related capacity shortfalls. Are other parts of the system too sluggish to benefit from added capacity? 5. Fix investment decisions on external signals, not on standards derived from past performance. 6. Avoid self-fulfilling prophecies. Challenge the assumptions that drive capacity investment decisions. 7. Search for diverse investment inputs. Seek new perspectives on products, services, and customer requirements. 	<p>UNDERINVESTING IN SERVICE CAPACITY</p>

Archetype/Application	Intervention Guidelines	Illustration
<p>LIMITS TO SUCCESS Application: Planning If we don't plan for limits, we are planning for failure. The "Limits to Success" archetype shows that being successful can be just as dangerous to long-term health as being unsuccessful. By mapping out the growth engines and potential danger points in advance, we can anticipate future problems and eliminate them before they become a threat.</p>	<ol style="list-style-type: none"> 1. Identify the growth engines. 2. Determine doubling time of those processes. 3. Identify potential limits and balancing loop(s)—physical capacity, information systems, personnel, management expertise, attitudes/mental models. 4. Determine change required to deal effectively with the limit(s) identified. 5. Assess time needed to change. Is there a discrepancy between the doubling time and the changes that need to be made to support that growth? 6. Balance the growth. What strategies can be used to balance the growth engine with the time frame of the investments that must be made to sustain it? 7. Reevaluate the growth strategy. Continually challenge assumptions in context of the broader company. 	<p>TECHNICAL SUPPORT CAPACITY LIMITS</p>
<p>SHIFTING THE BURDEN Application: Breaking Organizational Gridlock Organizational gridlock can be caused by interlocking "Shifting the Burden" structures, as one function's "solution" creates problems in another area. The archetype provides a starting point for breaking gridlock by identifying chains of problem symptoms and solutions that form walls between functions, departments, or divisions.</p>	<ol style="list-style-type: none"> 1. Identify the original problem symptom(s). 2. Map all "quick fixes" that appear to be keeping the problems under control. 3. Identify impact on others. What are the impacts of those "solutions" on other players in the company? 4. Identify fundamental solutions. Look at the situation from both perspectives to find a systemic solution. 5. Map side-effects of quick fixes that may be undermining the usability of the fundamental solution. 6. Find interconnections to fundamental loops. Find the links between the interaction effects and the fundamental solution that may be creating gridlock. 7. Identify high-leverage actions from both perspectives. 	<p>INTERLOCKING PROBLEMS IN CAR DEVELOPMENT PROGRAM</p> <p>*NVH = noise, vibration, harshness</p>
<p>SUCCESS TO THE SUCCESSFUL Application: Avoiding Competency Traps The "Success to the Successful" archetype suggests that success or failure may be due more to initial conditions than intrinsic merits. It can help organizations challenge their success loops by "unlearning" what they are already good at in order to explore new approaches and alternatives.</p>	<ol style="list-style-type: none"> 1. Investigate historical origins of competencies. 2. Identify potential competency traps. 3. Evaluate current measurement systems—are they set up to favor current systems over other alternatives? 4. Map internal view of market success. What are the operating assumptions regarding success in the market? 5. Obtain external views of market success. Ask "outsiders" for alternative strategies. 6. Assess effects on the innovative spirit. Is the current system excluding or limiting the spirit of experimentation that will lead to new alternatives? 7. Continually scan for gaps and areas for improvement. 	<p>SUCCESS OF THE "QWERTY" KEYBOARD</p>
<p>TRAGEDY OF THE COMMONS Application: Resource Allocation In a "Tragedy of the Commons" situation, the complex interaction of individual actions produces an undesirable collective result, such as the depletion of a common resource. The archetype can be used to help connect the long-term effects of individual actions to the collective outcome, and to develop measures for managing the common resource more effectively.</p>	<ol style="list-style-type: none"> 1. Identify the "commons." What is the common resource that is being shared? 2. Determine incentives. What are the reinforcing processes that are driving individual use of the resource? 3. Determine time frame for reaping benefits. 4. Determine time frame for experiencing cumulative effects of the collective action. 5. Make the long-term effects more present. How can the long-term loss or degradation of the commons be more real and present to the individual users? 6. Reevaluate the nature of the commons. Are there other resources or alternatives that can be used to remove the constraint upon the commons? 7. Limit access to resources. Determine a central focal point—a shared vision, measurement system, or final arbiter—that allocates the resource based on the needs of the whole system. 	<p>OVERGRAZING THE ALTERNATOR</p>

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Appendix B: Guidelines for Drawing Causal Loop Diagrams



Guidelines for Drawing Causal Loop Diagrams

by Daniel H. Kim

Causal loop diagrams, or CLDs, provide a language for articulating our understanding of the dynamic, interconnected nature of our world. We can think of them as sentences that are constructed by linking together key variables and indicating the causal relationships between them. By stringing together several loops, we can create a coherent story about a particular problem or issue.

Each loop consists of variables connected by arrows that represent causal connections showing the movement of feedback throughout the system. Each arrow is labeled with a sign ("s" or "o") that indicates how one variable affects another: "s" indicates a change in the same direction, and "o" a causal change in the opposite direction.

Causal loop diagrams are composed of a combination of balancing ("B") and reinforcing ("R") loops. A balancing process is goal-seeking in nature and tends to keep the system steady around a particular goal. A reinforcing loop, by contrast, produces either rapid growth or collapse by driving change in one direction with increasing change in the same direction each time you go around the loop. Balancing and reinforcing processes can be combined in an infinite number of combinations to describe the behavior of all kinds of systems, including the behavior of organizational systems.

	Guideline	Example
Selecting Variable Names	<p>1. Use nouns when choosing a variable name. Avoid verbs and action phrases, because the action is conveyed in the loop's arrows. For example, "Costs" is better than "Increasing Costs," because a decrease in Increasing Costs is confusing. The sign of the arrow ("s" for same or "o" for opposite) indicates whether Costs increase or decrease relative to the other variable.</p>	
	<p>2. Use variables that represent quantities that can vary over time. It does not make sense to say that "State of Mind" increases or decreases. A term like "Happiness," on the other hand, can vary.</p>	
	<p>3. Whenever possible, choose the more "positive" sense of a variable name. For example, the concept of "Growth" increasing or decreasing is clearer than an increase or decrease in "Contraction."</p>	
Loop Construction	<p>4. Think of the possible unintended consequences as well as the expected outcomes for every course of action included in the diagram. For example, an increase in "Production Pressure" may increase "Production Output," but it may also increase "Stress" and decrease "Quality."</p>	

PG03

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	Guideline	Example
Loop Construction	<p>5. All balancing loops are goal-seeking processes. Try to make explicit the goals driving the loop. For example, Loop B1 may raise questions as to why increasing "Quality" would lead to a decrease in "Actions to Improve Quality." By explicitly identifying "Desired Quality" as the goal in Loop B2, we see that the "Gap in Quality" is really driving improvement actions.</p>	
	<p>6. Distinguish between perceived and actual states, such as "Perceived Quality" versus "Actual Quality." Perceptions often change slower than reality does, and mistaking the perceived status for current reality can be misleading and create undesirable results.</p>	
	<p>7. If a variable has multiple consequences, start by lumping them into one term while completing the rest of the loop. For example, "Coping Strategies" can represent many different ways we respond to stress (exercise, meditation, alcohol use, etc.).</p>	
	<p>8. Actions almost always have different long-term and short-term consequences. Draw larger loops as they progress from short- to long-term processes. Loop B1 shows the short-term behavior of using alcohol to combat stress. Loop R2, however, draws out the long-term consequences of this behavior, showing that it actually <i>increases</i> stress.</p>	
General Tips	<p>9. If a link between two terms requires a lot of explanation to be clear, redefine the variables or insert an intermediate term. Thus, the relationship between "Demand" and "Quality" may be more obvious when "Production Pressure" is inserted in between them.</p>	
	<p>10. A shortcut to determining whether a loop is balancing or reinforcing is to count the number of "o's" in the loop. An odd number of "o's" indicates a balancing loop (i.e., an odd number of U-turns keeps you headed in the opposite direction); an even number or no "o's" means it is a reinforcing loop. CAUTION: After labeling the loop, you should always read through it to make sure the story agrees with your R or B label.</p>	



Appendix C:

Chapter 4

Designing Counterinsurgency Campaigns and Operations

The first, the supreme, the most far-reaching act of judgment that the statesman and commander have to make is to establish...the kind of war on which they are embarking; neither mistaking it for, nor trying to turn it into, something that is alien to its nature. This is the first of all strategic questions and the most comprehensive.

Carl von Clausewitz, *On War*

This chapter describes considerations for designing counterinsurgency campaigns and operations. For Army forces, this chapter applies aspects of command and control doctrine and planning doctrine to counterinsurgency campaign planning. While campaign design is most often associated with a joint force command, all commanders and staffs need to understand it.

THE IMPORTANCE OF CAMPAIGN DESIGN

4-1. In chapter 1, insurgency is described as an organized, protracted politico-military struggle designed to weaken government control and legitimacy while increasing insurgent control. Ultimately, the long-term objective for both sides in that struggle remains acceptance by the people of the state or region of the legitimacy of one side's claim to political power. The reason an insurgency forms to challenge the existing order is different in each case. The complexity of insurgency presents problems that have incomplete, contradictory, and changing requirements. The solutions to these intensely challenging and complex problems are often difficult to recognize as such because of complex interdependencies. While attempting to solve an intensely complex problem, the solution of one of its aspects may reveal or create another, even more complex, problem. The purpose of design is to achieve a greater understanding, a proposed solution based on that understanding, and a means to learn and adapt. For a U.S. military commander directed to counter an insurgency, knowing why an insurgent movement has gained support and the purpose of American involvement is essential in designing a counterinsurgency (COIN) campaign. Failure to understand both factors can have disastrous consequences, as illustrated by Napoleon's experience in Spain.

Campaign Assessment and Reassessment

During Napoleon's occupation of Spain in 1808, it seems little thought was given to the potential challenges of subduing the Spanish populace. Conditioned by the decisive victories at Austerlitz and Jena, Napoleon believed the conquest of Spain would be little more than a "military promenade." Napoleon's campaign included a rapid conventional military victory but ignored the immediate requirement to provide a stable environment for the populace.

The French failed to analyze the Spanish people, their history, culture, motivations, and potential to support or hinder the achievement of French political objectives. The Spanish people were accustomed to hardship, suspicious of foreigners and constantly involved in skirmishes with security forces. Napoleon's cultural miscalculation resulted in a protracted occupation struggle that lasted nearly six years and ultimately required approximately three-fifths of the Empire's total armed strength, almost four times the force of 80,000 Napoleon originally designated.

The Spanish resistance drained the resources of the French Empire. It was the beginning of the end for Napoleon. At the theater level, a complete understanding of the problem and a campaign design that allowed the counterinsurgency force to learn and adapt was lacking.

4-2. Design and planning are qualitatively different yet interrelated activities essential for solving complex problems. While planning activities receive consistent emphasis in both doctrine and practice, discussion of design remains largely abstract and is rarely practiced. Presented a problem, staffs often rush directly into planning without clearly understanding the complex environment of the situation, purpose of military involvement, and approach required to address the core issues. This situation is particularly problematic with insurgencies. Campaign design informs and is informed by planning and operations. It has an intellectual foundation that aids continuous assessment of operations and the operational environment. Commanders should lead the design process and communicate the resulting framework to other commanders for planning, preparation, and execution.

THE RELATIONSHIP BETWEEN DESIGN AND PLANNING

4-3. It is important to understand the distinction between design and planning. (See figure 4-1.) While both activities seek to formulate ways to bring about preferable futures, they are cognitively different. Planning applies established procedures to solve a largely understood problem within an accepted framework. Design inquires into the nature of a problem to conceive a framework for solving that problem. In general, planning is problem solving, while design is problem setting. Where planning focuses on generating a plan—a series of executable actions—design focuses on learning about the nature of an unfamiliar problem.

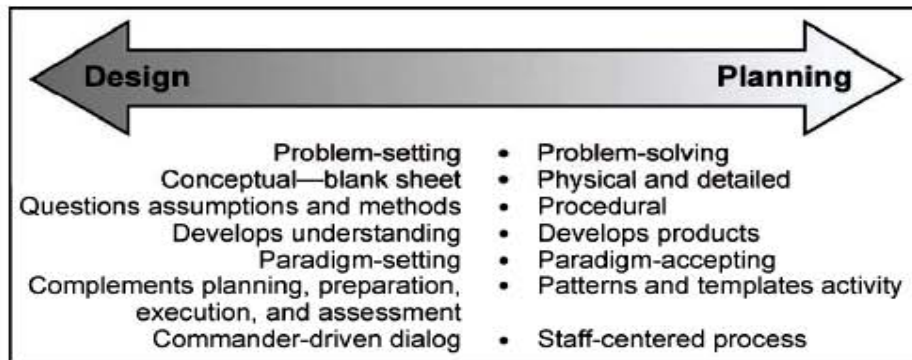


Figure 4-1. Design and planning continuum

4-4. When situations do not conform to established frames of reference—when the hardest part of the problem is figuring out what the problem is—planning alone is inadequate and design becomes essential. In these situations, absent a design process to engage the problem’s essential nature, planners default to doctrinal norms; they develop plans based on the familiar rather than an understanding of the real situation. Design provides a means to conceptualize and hypothesize about the underlying causes and dynamics that explain an unfamiliar problem. Design provides a means to gain understanding of a complex problem and insights towards achieving a workable solution.

4-5. This description of design at the tactical level is a form of what Army doctrine calls commander’s visualization. Commanders begin developing their design upon receipt of a mission. Design precedes and forms the foundation for staff planning. However, design is also continuous throughout the operation. As part of assessment, commanders continuously test and refine their design to ensure the relevance of military action to the situation. In this sense, design guides and informs planning, preparation, execution, and assessment. However, a plan is necessary to translate a design into execution. (FM 6-0, paragraphs 4-17 through 4-25, discusses commander’s visualization.)

4-6. Planning focuses on the physical actions intended to directly affect the enemy or environment. Planners typically are assigned a mission and a set of resources; they devise a plan to use those resources to accomplish that mission. Planners start with a design (whether explicit or implicit) and focus on generating a plan—a series of executable actions and control measures. Planning generally is analytic and reductionist. It breaks the design into manageable pieces assignable as tasks, which is essential to transforming the design into an executable plan. Planning implies a stepwise process in which each step produces an output that is the necessary input for the next step. (FM 5-0 contains Army planning doctrine. MCDP 5 contains Marine Corps planning doctrine.)

THE NATURE OF DESIGN

4-7. Given the difficult and multifaceted problems of insurgencies, dialog among the commander, principal planners, members of the interagency team, and host-nation (HN) representatives helps develop a coherent design. This involvement of all participants is essential. The object of this dialog is to achieve a level of situational understanding at which the approach to the problem's solution becomes clear. The underlying premise is this: when participants achieve a level of understanding such that the situation no longer appears complex, they can exercise logic and intuition effectively. As a result, design focuses on framing the problem rather than developing courses of action.

4-8. COIN design must be iterative. By their nature, COIN efforts require repeated assessments from different perspectives to see the various factors and relationships required for adequate understanding. Assessment and learning enable incremental improvements to the design. The aim is to rationalize the problem—to construct a logical explanation of observed events and subsequently construct the guiding logic that unravels the problem. The essence of this is the mechanism necessary to achieve success. This mechanism may not be a military activity—or it may involve military actions in support of nonmilitary activities. Once commanders understand the problem and what needs to be accomplished to succeed, they identify the means to assess effectiveness and the related information requirements that support assessment. This feedback becomes the basis for learning, adaptation, and subsequent design adjustment.

CONSIDERATIONS FOR DESIGN

4-9. Key design considerations include the following:

- Critical discussion.
- Systems thinking.
- Model making.
- Intuitive decision making.
- Continuous assessment.
- Structured learning.

4-10. Rigorous and structured *critical discussion* provides an opportunity for interactive learning. It deepens shared understanding and leverages the collective intelligence and experiences of many people.

4-11. *Systems thinking* involves developing an understanding of the relationships within the insurgency and the environment. It also concerns the relationships of actions within the various logical lines of operations (LLOs). This element is based on the perspective of the systems sciences that seeks to understand the interconnectedness, complexity, and wholeness of the elements of systems in relation to one another.

4-12. In *model making*, the model describes an approach to the COIN campaign, initially as a hypothesis. The model includes operational terms of reference and concepts that shape the language governing the conduct (planning, preparation, execution, and assessment) of the operation. It addresses questions like these: Will planning, preparation, execution, and assessment activities use traditional constructs like center of gravity, decisive points, and LLOs? Or are other constructs—such as leverage points, fault lines, or critical variables—more appropriate to the situation?

4-13. The Army and Marine Corps define *intuitive decision making* as the act of reaching a conclusion which emphasizes pattern recognition based on knowledge, judgment, experience, education, intelligence,

boldness, perception, and character. This approach focuses on assessment of the situation vice comparison of multiple options (FM 6-0/MCRP 5-12A). An operational design emerges intuitively as understanding of the insurgency deepens.

4-14. *Continuous assessment* is essential as an operation unfolds because of the inherent complexity of COIN operations. No design or model completely matches reality. The object of continuous assessment is to identify where and how the design is working or failing and to consider adjustments to the design and operation.

4-15. The objective of *structured learning* is to develop a reasonable initial design and then learn, adapt, and iteratively and continuously improve that design as more about the dynamics of the COIN problem become evident.

DESIGN FOR COUNTERINSURGENCY

4-16. Through design commanders gain an understanding of the problem and the COIN operation's purpose within the strategic context. Communicating this understanding of the problem, purpose, and context to subordinates allows them to exercise subordinates' initiative. *Subordinates' initiative* is assumption of responsibility for deciding and initiating independent actions when the concept of operations or order no longer applies or when an unanticipated opportunity leading to the accomplishment of the commander's intent presents itself (FM 6-0). (Subordinates' initiative is discussed in FM 6-0, paragraphs 2-83 through 2-92.) It facilitates decentralized execution and continuous assessment of operations at all levels throughout the campaign. While traditional aspects of campaign design as expressed in joint and Service doctrine remain relevant, they are not adequate for a discussion of the broader design construct for a COIN environment. Inherent in this construct is the tension created by understanding that military capabilities provide only one component of an overall approach to a COIN campaign. Design of a COIN campaign must be viewed holistically. Only a comprehensive approach employing all relevant design components, including the other instruments of national power, is likely to reach the desired end state.

4-17. As noted above, this description of campaign design is a form that Army doctrine calls commander's visualization. Design begins with identification of the end state, as derived from the policy aim. (Joint doctrine defines the *end state* as the set of required conditions that defines achievement of the commander's objectives [JP 1-02]). The end state provides context and logic for operational and tactical decision making. Consequently, strategic goals must be communicated clearly to commanders at every level. While strategy drives design, which in turn drives tactical actions, the reverse is also true. The observations of tactical actions result in learning and greater understanding that may generate modifications to the design, which in turn may have strategic implications. The COIN imperative to "Learn and Adapt" is essential in making the design process work correctly. Figure 4-2 illustrates the iterative nature of COIN campaign design and the large number of factors involved.

COMMANDER'S INTENT AND VISION OF RESOLUTION

4-18. Guided by the campaign's purpose, commanders articulate an operational logic for the campaign that expresses in clear, concise, conceptual language a broad vision of what they plan to accomplish. The operational logic is the commander's assessment of the problem and approach toward solving it. Commanders express it as the commander's intent. Ideally, the operational logic is expressed clearly and simply but in comprehensive terms, such as what the commander envisions achieving with various components or particular LLOs. This short statement of the operational logic helps subordinate commanders and planners, as well as members of other agencies and organizations, see the campaign's direction. It provides a unifying theme for interagency planning.

4-19. In addition, commanders also issue a form of planning guidance called the vision of resolution. The vision of resolution is usually expressed in the form of LLOs. LLOs for a counterinsurgency may include the following:

- Conduct information operations.
- Conduct combat operations/civil security operations.
- Train and employ HN security forces.

- Establish or restore essential services.
- Support development of better governance.
- Support economic development.

This list is an example only. Commanders determine the LLOs appropriate to the situation based on their assessment and their dialog with the leaders of other participating organizations.

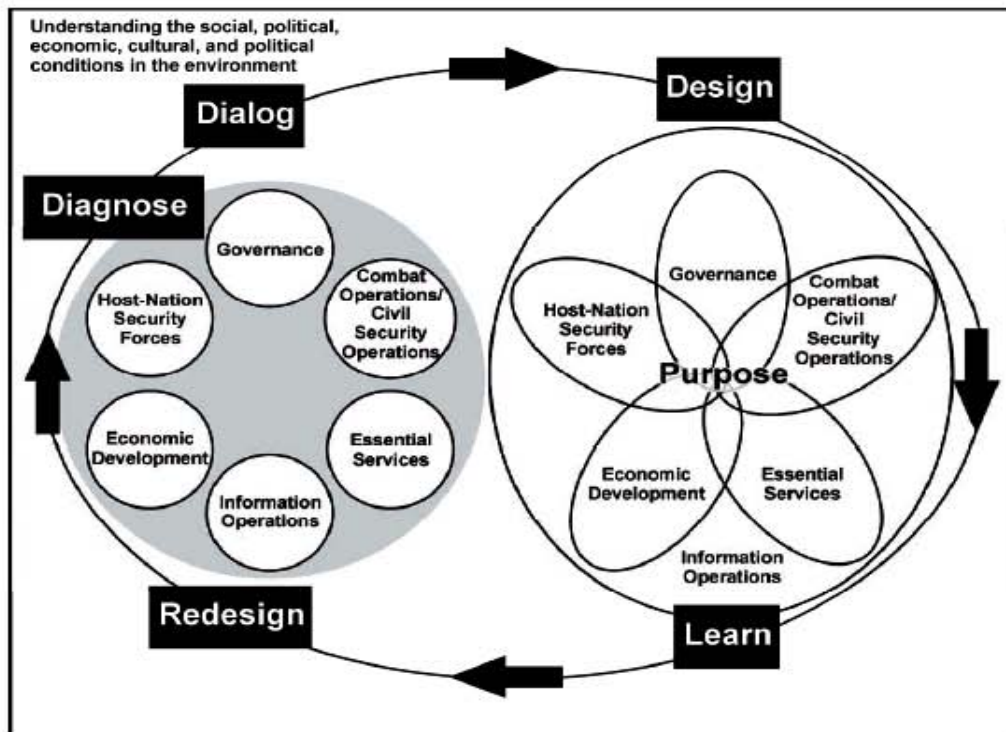


Figure 4-2. Iterative counterinsurgency campaign design

4-20. LLOs like those listed in paragraph 4-19 are not intended as a “success template.” Selecting and applying them requires judgment. The mosaic nature of insurgencies and the shifting circumstances within each area of operations (AO) requires a different emphasis on and interrelationship among the various lines. The situation may also require that military forces closely support, or temporarily assume responsibility for, tasks normally accomplished by other government agencies and private organizations. By broadly describing how the LLOs interact to achieve the end state, commanders provide the operational logic to link the various components in a comprehensive framework. This framework guides the initiative of subordinate commanders as they establish local conditions that support achieving the overall end state. It also promotes unity of effort among joint, interagency, multinational, and HN partners.

LOCAL RELEVANCE

4-21. Informed by the commander’s intent—including the end state and vision of resolution—subordinate commanders tailor and prioritize their actions within the LLOs based on the distinct and evolving circumstances within their respective AOs. Military forces are accustomed to unity of command; however, the interagency and multinational nature of COIN operations usually makes such arrangements unlikely. All participating organizations do share attitudes and goals. General cooperation on matters of mutual concern, established through informal agreements, may be the most practicable arrangement. Therefore, effective commanders empower subordinate leaders to perform the coordination, cooperation, and innovation needed to achieve unity of effort and execute operations in the manner best suited to local

conditions. The design—consisting of the commander’s intent, vision of resolution and other guidance issued as the campaign unfolds, and end state—provides the framework within which subordinates exercise this form of initiative.

LEARNING IN EXECUTION

4-22. Before commanders deploy their units, they make every effort to mentally prepare their Soldiers or Marines for the anticipated challenges, with a particular focus on situational awareness of the anticipated AO. *Situational awareness* is knowledge of the immediate present environment, including knowledge of the factors of METT-TC (FMI 5-0.1). COIN operations require a greater focus on civil considerations—the C in METT-TC—than conventional operations do. This situational awareness is only the beginning of an understanding of the AO that will mature as operations progress. However, commanders use it to begin to establish a common frame of reference.

4-23. Design begins based on this initial awareness. Aspects of the problem and means of resolving them do not remain static. Conditions are seldom consistent throughout any AO and continue to change based on actions by friendly, enemy, neutral, and other involved organizations. Rather than being uniform in character, the operational environment is likely to display a complex, shifting mosaic of conditions. To be effective, commanders—and indeed all personnel—continually develop and enhance their understanding of the mosaic peculiar to their AO. Observing tactical actions and the resulting changing conditions deepens understanding of the environment and enables commanders to relearn and refine their design and implementation actions.

4-24. Initially, situational awareness will probably be relatively low and the design will, by necessity, require a number of assumptions, especially with respect to the populace and the force’s ability to positively influence their perception of events. The design can be viewed as an experiment that tests the operational logic, with the expectation of a less-than-perfect solution. As the experiment unfolds, interaction with the populace and insurgents reveals the validity of those assumptions, revealing the strengths and weaknesses of the design.

4-25. *Assessment* is the continuous monitoring and evaluation of the current situation and progress of an operation (FMI 5-0.1). Effective assessment is necessary for commanders to recognize changing conditions and determine their meaning. It is crucial to successful adaptation and innovation by commanders within their respective AOs. A continuous dialog among commanders at all echelons provides the feedback the senior commander needs to refine the design. The dialog is supported by formal assessment techniques and red-teaming to ensure commanders are fully cognizant of the causal relationships between their actions and the insurgents’ adaptations. Accordingly, assessment is a learning activity and a critical aspect of design. This learning leads to redesign. Therefore, design can be viewed as a perpetual design-learn-redesign activity, with the commander’s intent, vision of resolution, and end state providing the unifying themes.

4-26. The critical role of assessment necessitates establishing measures of effectiveness during planning. Commanders should choose these carefully so that they align with the design and reflect the emphasis on and interrelationship among the LLOs. Commanders and staffs revise their assessment and measures of effectiveness during the operation in order to facilitate redesign and stay abreast of the current situation. Sound assessment blends qualitative and quantitative analysis with the judgment and intuition of all leaders. Great care must be applied here, as COIN operations often involve complex societal issues that may not lend themselves to quantifiable measures of effectiveness. Moreover, bad assumptions and false data can undermine the validity of both assessments and the conclusions drawn from them. Data and metrics can inform a commander’s assessment. However they must not be allowed to dominate it in uncertain situations. Subjective and intuitive assessment must not be replaced by an exclusive focus on data or metrics. Commanders must exercise their professional judgment in determining the proper balance.

GOALS IN COUNTERINSURGENCY

4-27. In an ideal world, the commander of military forces engaged in COIN operations would enjoy clear and well-defined goals for the campaign from the very beginning. However, the reality is that many goals emerge only as the campaign develops. For this reason, counterinsurgents usually have a combination of

defined and emerging goals toward which to work. Likewise, the complex problems encountered during COIN operations can be so difficult to understand that a clear design cannot be developed initially. Often, the best choice is to create iterative solutions to better understand the problem. In this case, these iterative solutions allow the initiation of intelligent interaction with the environment. The experiences of the 1st Marine Division during Operation Iraqi Freedom II illustrate this situation.

Iterative Design During Operation Iraqi Freedom II

During Operation Iraqi Freedom II (2004-2005), the 1st Marine Division employed an operational design similar to that used during the Philippine Insurrection (circa 1902). The commanding general, Major General James N. Mattis, USMC, began with an assessment of the people that the Marines, Soldiers, and Sailors would encounter within the division's area of operations. The area of operations was in western Iraq/AI Anbar Province, which had a considerably different demographic than the imam-led Shia areas in which the division had operated during Operation Iraqi Freedom I.

Major General Mattis classified provincial constituents into three basic groups: the tribes, former regime elements, and foreign fighters. The tribes constituted the primary identity group in western Iraq/AI Anbar Province. They had various internal tribal affiliations and looked to a diverse array of sheiks and elders for leadership. The former regime elements were a minority that included individuals with personal, political, business, and professional ties to the Ba'ath Party. These included civil servants and career military personnel with the skills needed to run government institutions. Initially, they saw little gain from a democratic Iraq. The foreign fighters were a small but dangerous minority of transnational Islamic subversives.

To be successful, U.S. forces had to apply a different approach to each of these groups within the framework of an overarching plan. As in any society, some portion of each group included a criminal element, further complicating planning and interaction. Major General Mattis's vision of resolution comprised two major elements encompassed in an overarching "bodyguard" of information operations. (See figure 4-3, page 4-8.)

The first element and main effort was diminishing support for insurgency. Guided by the maxims of "first do no harm" and "no better friend—no worse enemy," the objective was to establish a secure local environment for the indigenous population so they could pursue their economic, social, cultural, and political well-being and achieve some degree of local normalcy. Establishing a secure environment involved both offensive and defensive combat operations with a heavy emphasis on training and advising the security forces of the fledgling Iraqi government. It also included putting the populace to work. Simply put, an Iraqi with a job was less likely to succumb to ideological or economic pressure to support the insurgency. Other tasks included the delivery of essential services, economic development, and the promotion of governance. All were geared towards increasing employment opportunities and furthering the establishment of local normalcy. Essentially, diminishing support for insurgency entailed gaining and maintaining the support of the tribes, as well as converting as many of the former regime members as possible. "Fence-sitters" were considered a winnable constituency and addressed as such.

The second element involved neutralizing the bad actors, a combination of irreconcilable former regime elements and foreign fighters. Offensive combat operations were conducted to defeat recalcitrant former regime members. The task was to make those who were not killed outright see the futility of resistance and give up the fight. With respect to the hard-core extremists, who would never give up, the task was more straightforward: their complete and utter destruction. Neutralizing the bad actors supported the main effort by improving the local security environment. Neutralization had to be accomplished in a discrete and discriminate manner, however, in order to avoid unintentionally increasing support for insurgency.

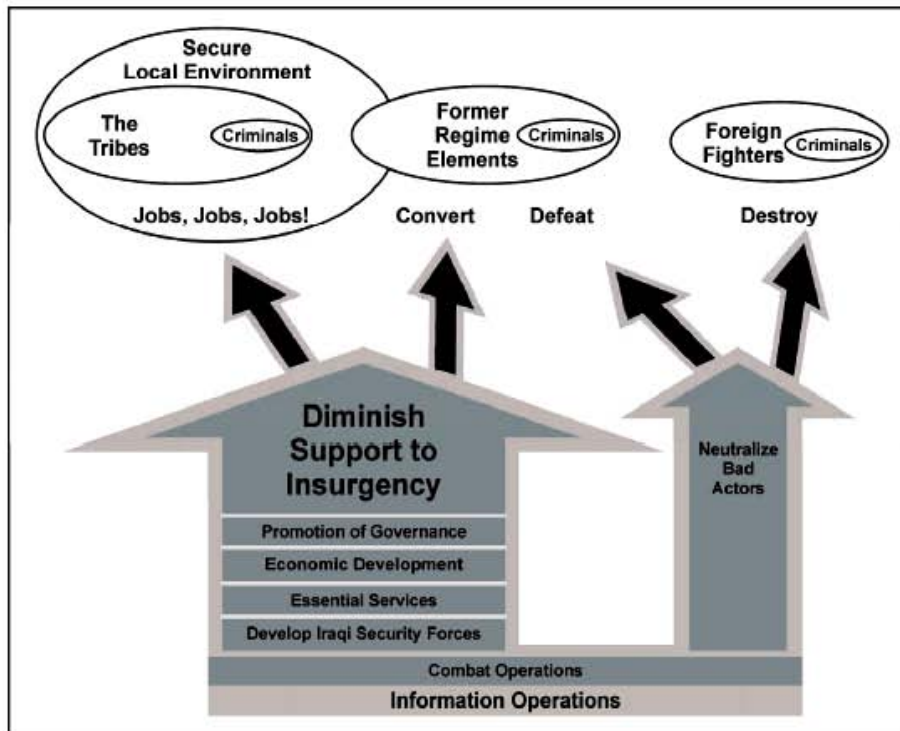


Figure 4-3. 1st Marine Division's operational design for Operation Iraqi Freedom II

Both elements described above were wrapped in an overarching "bodyguard" of information operations. Information operations, both proactive and responsive, were aggressively employed to favorably influence the populace's perception of all coalition actions while simultaneously discrediting the insurgents. These tasks were incredibly difficult for a number of reasons. Corruption had historically been prevalent among Iraqi officials, generating cynicism toward any government. Additionally, decades of Arab media mischaracterization of U.S. actions had instilled distrust of American motives. The magnitude of that cynicism and distrust highlighted the critical importance of using information operations to influence every situation.

In pursuing this vision of resolution, the 1st Marine Division faced an adaptive enemy. Persistent American presence and interaction with the populace threatened the insurgents and caused them to employ more open violence in selected areas of Al Anbar province. This response resulted in learning and adaptation within the 1st Marine Division. The design enabled 1st Marine Division to adjust the blend of "diminishing support for insurgents" and "neutralizing bad actors" to meet the local challenges. Throughout the operation, 1st Marine Division continued learning and adapting with the vision of resolution providing a constant guide to direct and unify the effort.

SUMMARY

4-28. Campaign design may very well be the most important aspect of countering an insurgency. It is certainly the area in which the commander and staff can have the most influence. Design is not a function to be accomplished, but rather a living process. It should reflect ongoing learning and adaptation and the growing appreciation counterinsurgents share for the environment and all actors within it, especially the insurgents, populace, and HN government. Though design precedes planning, it continues throughout planning, preparation, and execution. It is dynamic, even as the environment and the counterinsurgents' understanding of the environment is dynamic. The resulting growth in understanding requires integrated assessment and a rich dialog among leaders at various levels to determine the need for adaptation throughout the COIN force. Design should reflect a comprehensive approach that works across all LLOs in a manner applicable to the stage of the campaign. There should only be one campaign and therefore one design. This single campaign should bring in all players, with particular attention placed on the HN participants. Design and operations are integral to the COIN imperative to "Learn and Adapt," enabling a continuous cycle of design-learn-redesign to achieve the end state.

Appendix D: A Guide to Practicing Dialogue



A Guide to Practicing Dialogue



by Glenna Gerard and Linda Ellinor

Businesses are increasingly recognizing dialogue as a powerful tool for cultivating the attitudes, values, and behaviors that promote widespread organizational learning, creativity, and motivation. Dialogue can help organizations realize such goals as building shared vision, working imaginatively with diverse perspectives, and forging alignment and trust within teams during times of change.

What Is Dialogue?

Dialogue is a set of practices based on the idea of people coming together to create collective understanding. In its simplest sense, it is a form of conversation whose purpose is to promote understanding and learning. As such, dialogue differs markedly from the conversational form known as discussion. We often use discussion to arrive at one point of view quickly so that we can make a decision or take action. In dialogue, where the primary intention is learning, we are most interested in understanding others' perspectives and in clarifying together what we are trying to accomplish. This process leads to more effective actions and more innovative decisions and strategies than before.

The Conversation Continuum

DIALOGUE	DISCUSSION/DEBATE
Seeing the <i>whole</i> among parts	Breaking issues/problems into <i>parts</i>
Seeing the <i>connections</i> between parts	Seeing <i>distinctions</i> between parts
<i>Inquiring</i> into assumptions	<i>Justifying/defending</i> assumptions
<i>Learning</i> through inquiry and disclosure	<i>Persuading, selling, telling</i>
Creating <i>shared</i> meaning	Gaining agreement on <i>one</i> meaning
 <p>I wonder how these pieces combine to create a whole?</p>	 <p>I wonder which of these pieces is the right one?</p>
<p>In a dialogue, people:</p> <ul style="list-style-type: none"> • express a desire to hear what all present have to say; • listen deeply—especially when they disagree with one another; • seek to identify each others' assumptions about issues by asking clarifying questions; • speak at a slower pace, often punctuated by pauses, as they reflect on what they're hearing; and • try to understand how all the different perspectives fit into the big picture. 	<p>In a discussion, people:</p> <ul style="list-style-type: none"> • talk over one another to be heard, with others saying nothing at all; • advocate their position while soliciting few questions except to gather data to prove or disprove a point; • express evaluative comments, many of them negative, such as "That will never work" or "You can't be serious!"; • speak quickly with almost no pauses of any kind; and • try to make quick decisions that will allow for immediate action.

Tips for Practicing Dialogue Skills

SUSPENSION OF JUDGMENT	
<p>Practicing breathing slowly to release your thoughts. Sit quietly for five minutes and focus on your breathing. Notice each time you are distracted by a thought, then let the thought go and refocus on your breathing.</p>	<p>Notice the impact your judgments have on your listening in at least one conversation each day.</p> <p>Use your imagination to put your judgments to one side as you continue to listen. Each time a judgment arises, suspend it and continue to listen.</p>
ASSUMPTION IDENTIFICATION	
<p>Observe your reactions when you encounter a person with an opinion that differs from yours. Ask yourself, "What lens am I looking through that differs from the one this person is using? What assumptions and beliefs underlie <i>both</i> of our perspectives?"</p> <p>Notice how the assumptions you hold about certain people influence the kinds of conversations</p>	<p>you have with them. Experiment with purposefully holding a different assumption about someone.</p> <p>Explore your own mental models and inquire into the thinking of someone else who sees things differently than you by using the Ladder of Inference (for more information, see <i>Dialogue: Rediscover the Transforming Power of Conversation</i> by Linda Ellinor and Glenna Gerard).</p>
LISTENING	
<p>Consider how well you're listening to others. When they're talking, what behaviors and internal thoughts of yours emerge?</p> <p>Notice when you listen openly and when you don't. What situations block your ability to listen? Inspire you to listen?</p>	<p>Observe your emotional responses when you sense yourself resisting listening to someone. What happens when you do not resist?</p> <p>Listen for collective meaning by asking during a meeting or conversation: "If there were one voice speaking here, what would it be saying?"</p>
INQUIRY	
<p>Try to reveal more of a person's thinking when you don't understand or when you disagree with what he or she is saying. For example, ask, "What data did you base your thinking on?" or "What other examples led you to that conclusion?"</p> <p>Ask questions about the possible relationships</p>	<p>between diverse perspectives. For example, ask, "How are our different ideas about this issue connected?"</p> <p>Practice staying in the question rather than rushing to solve a problem or reach a conclusion. Notice any discomfort you have when it takes time for a group to solve a complex problem or to answer a difficult question</p>
REFLECTION	
<p>Notice your reactions when silence occurs in a conversation. When do you feel comfortable and uncomfortable?</p> <p>Practice pausing and taking a few breaths before answering a question, or speaking more slowly. Notice any changes in the way you respond.</p> <p>Use your breathing to move to the position of neutral observer and gather information from</p>	<p>there. Taking on the observer role expands the range of your perception.</p> <p>Set aside a few minutes at the end of a meeting or one-on-one conversation to ponder the gathering's major learnings—both in terms of the content talked about and the form of conversation used (dialogue, discussion, etc.).</p>

Using Dialogue in Problem-Solving and Decision-Making

<p>When faced with a stubborn, recurring problem, inquire into the observations, interpretations, and assumptions that people hold about the problem—and possible solutions they might have to offer.</p> <p>When you aren't getting the result you desire, look at your assumptions and the thinking that led you to the decisions and actions that produced the result.</p>	<p>When problems emerge, recognize and deal with them <i>before</i> they become full-blown crises by using periodic "What's on Your Mind?" conversations within your group.</p> <p>When you need to make an important decision that affects many people, hold a dialogue to ensure that all voices have been heard and that the thinking underlying the different alternatives has been surfaced. Then move to a decision.</p>
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This material is drawn from *Dialogue at Work: Skills for Leveraging Collective Understanding*, by Glenna Gerard and Linda Ellinor, a volume in Pegasus Communications' *Innovations in Management Series*.

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Appendix E: Glossary

Generative Complexity

lacunae -- a blank space or a missing part : gap 2 : a small cavity, pit, or discontinuity in an anatomical structure.³¹

*Operational Design (verb) – an interactive process including the sponsor and the operational designer by which the sponsor’s vision is crystallized in the minds of both participants

*Operational Design (noun) – an abstract, cognitive model, generally in the form of graphics and accompanying narratives, that represents the interaction between the problem and the solution by depicting overall strategic system, the operational system, the strategic vision (ends), and the operations (ways)

Operational environment (DOD) A composite of the conditions, circumstances, and influences that affect the employment of military forces and bear on the decisions of the unit commander. Some examples are as follows. a. permissive environment--Operational environment in which a host country’s military and law enforcement agencies have control as well as the intent and capability to assist operations that a unit intends to conduct. b. uncertain environment--Operational environment in which host government forces, whether opposed to or receptive to operations that a unit intends to conduct, do not have totally effective control of the territory and population in the intended operational area. c. hostile environment--Operational environment in which hostile forces have control as well as the intent and capability to effectively oppose or react to the operations a unit intends to conduct.³²

Social Complexity (adj) disunity of thought arising from ir-reconciled cognitive process including heuristics, models and practices grounded in beliefs and values.

*Strategic vision (noun) – the system that includes the strategic sponsor’s aims, goals, desired effects, results, and end state and their collective interaction

*Strategic Sponsor (noun) – the President or Secretary of Defense

*Author’s definitions

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