

DESIGN: How, Not Why

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To regard thinking as a skill rather than a gift is the first step towards doing something to improve that skill.

—Edward de Bono, *Practical Thinking*

NEARLY EVERY CONTEMPORARY ARTICLE on operational “design” addresses the question, “Why design?” This article discusses “how to design” instead and addresses the concepts of design needed for that enterprise. We base this discussion on the educational experiences gleaned from the School of Advanced Military Studies (SAMS) and observations during involvement in the Army’s Unified Quest 2009 exercise. Our ideas are underpinned by a broad theoretical, philosophical, historical, and doctrinal education at SAMS and by discussions with staff officers from Army component commands.

Central to the debate over design is the integration of its philosophy and capability into military command and control practices and Army culture. Design aids in understanding, visualizing, and describing complex situations and has tremendous potential to help the Army contend with the challenges of the 21st century in a more comprehensive way. Applying the tenets listed in field manual (FM) 6-0, *Mission Command*, this article aims to move forward by answering the questions “How does one incorporate design into a unit?” (command) and “How does one lead design?” (control).

Moving from Theory to Practice

Design is a part of Army doctrine now and will to expand in the future. There are references to campaign design as far back as the 1980s in FM 100-5, *Operations*. Recently, Training and Doctrine Command (TRADOC) codified design, including sections in FM 3-0, *Operations*; FM 3-07, *Stability Operations*; FM 3-24, *Counterinsurgency*; and TRADOC Pamphlet 525-5-500, *Commander’s Appreciation and Campaign Design*. Several military officers and theorists have written on design, and this discourse has further developed involved concepts. Such articles have contributed to an evolutionary process resulting in the drafting of Field Manual Interim (FMI) 5-2, *Design*. While still under refinement, design has gained traction. SAMS, Army Central Command, and Special Operations Command are among the organizations currently using design to manage and solve complex operational problems.

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PHOTO: U.S. Army LTG P.K. Keen, commander of Joint Task Force-Haiti, visits Haitians 21 January 2010, in Port-au-Prince, Haiti. Thousands of Haitians became displaced persons due to the earthquake that struck the area on 12 January 2010. (U.S. Navy, Mass Communication Specialist 2d Class Laura A. Moore)

Command and culture. The first conception of design is that it is a nuanced cognitive approach and adaptive leadership model that helps to define, frame, and manage complex problems. Successful employment of design will require a shift from the current power leadership model and culture in the U.S. Army, which is optimized to address technical problem solving. Design requires a more open and collaborative command culture, one that is adaptive and more capable of contending with the complex challenges that we are encountering in the contemporary operating environment.¹ The Army defines design as “an approach to critical and creative thinking that enables a commander to create understanding about a unique situation and to visualize and describe how to generate change.”² The commander is central to the design approach and must create the right unit culture to allow a free and open exchange of ideas without fear of reprisal.

Military commanders expecting to employ design methods should create a framework for iterative learning within the unit and lead the learning. Leading the learning is the essence of orchestrating adaptive work in complex problem management. Application of design theory to the art of command is difficult, as both design philosophy and the art of command are nuanced intangibles. Incorporating design leads to harvesting the corporate intellect of an organization because it involves sharing understanding. A culture of critical and creative thinking is necessary.

Design team to harvest corporate intellect. The challenges in contemporary conflicts are complex and eclipse the intellectual capability and development of any one commander. Therefore, commanders today must understand how to lead organizational learning in combat. FM 6-0 recognizes that “mission command can only work in an environment of trust and mutual understanding.”³ By position, commanders possess the authority to make decisions, and their leadership determines how effectively subordinates execute those decisions.

Because of the commander’s authority and experience, he naturally possesses a broader understanding than the individual staff officer. The commander sees and understands the battlefield better, and he must share information and actively contribute to creating solutions.⁴ Design processes help harness the creative energy and intellect of the entire

organization to help identify and set problems. Commanders do this instinctively when they hold huddles with subordinate commanders or key staff, and design seeks to codify and increase the number of such adaptive unit learning opportunities. Commanding in complex environments requires intellectually agile leadership competent enough to guide adaptive work over time. Design is a tool that can help to enhance adaptive leadership and decision making. FM 3-0 states, “Understanding is the basis of the commander’s visualization.”⁵ However, the only method for gaining understanding in FM 3-0 is battlefield circulation and reliance on the commander’s education, intellect, experience, and perception. Design offers further methods to gain understanding.⁶

The U.S. Army is among the most commander-centric armies in the world, and it expects competent leadership from commanders.⁷ However, changes in the complexity of mission expectations suggest the commander must create new mechanisms for learning. Design’s cultural shift toward broad creativity reduces the emphasis on individual achievement and power leadership to an approach that gives the adaptive work back to the stakeholders (unit members) for problem identification, management, and solving.

Practicing Design as the Commander

The designing commander’s responsibility is to manage the learning of the organization. Commanders should encourage officers to continue their education and challenge themselves and their assumptions critically and continuously. Commanders should challenge junior officers intellectually and encourage them to be self-educating, critical thinkers. Given the right command climate and education, junior officers can offer fresh perspectives, and they should learn to think critically through the study of history, geography, culture, social sci-

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ence, philosophy, and engineering. Such education facilitates organizational, iterative learning.

A design strategy is similar to a planner's "plan to plan." However, an important component of design philosophy encourages staff officers to question their understanding of the commander's guidance and clarify limits of tolerance. This is a cultural reverse for the Army's power culture, and continuing to challenge descriptive guidance will be difficult for any design team. The time compression and "rush to decision" of normal Army staff work in traditional command climates is rooted in the "power leadership model." That model is counterproductive because it actually reduces understanding in complex environments. It reflexively eliminates the number of options ultimately available to the command.

Control. A major element of design is control. Successful design work requires broad freedom of action and a flexible task organization. Subordinate stakeholders must be given the space to explore and discover problems on their own terms. This requires great freedom of action and is analogous to mission command's concept of control. The Army defines control as—

"The regulation of forces and battlefield operating systems to accomplish the mission in accordance with the commander's intent. It includes collecting, processing, displaying, storing, and disseminating relevant information for creating the common operational picture, and using information, primarily by the staff, during the operations process."⁸

In this context, the discussion of controlling design must account for the structure, the methodology employed, and the methods available for use within that methodology. All these elements comprise the "how" of design as an act.

Design structure and methodology. Structure in mission command "determines interactions among the elements of the organization, whether units or individuals."⁹ Structure in design involves determining a methodology that gives an operable framework and enables group contribution, which is required for developing corporate, shared understanding. Understanding the methodology allows for design team flexibility in the form of a strategy to manage the work as well as the sizing of the design team as learning occurs and the situation evolves.

Because design must produce something other than a new frame of mind, methodologies are important. Many design theorists have debated over the appropriateness of a design process. Understanding the methodology of design is commonly a matter of scale. At some level, there is a logical progression of things that must occur during design and a commonality of action and cognition. Many who embrace design resist the acceptance of an overarching methodology, which is related to the fear that design will become a process instead of an approach. Education in design theory and history reveals that there are dozens of operable methodologies in design, which address everything from fashion design to engineering design. A common understanding and language to adopt a design methodology is important.¹⁰ To that end, the Army published a broad, but useful and operable, methodology in the "Issue Paper on Design." This methodology is broad enough to allow for a variety of design strategies and the application of different methods, a cognitive framework that enables common language.

Divergence, transformation, and convergence. The design team leaders must transition design teams among three cognitive stances to create a design. SAMS proposes a three-part methodology. It proceeds from an understanding of the environment to framing the problem inherent in that environment, and it then communicates that understanding through a design concept. These three phases (divergent, transformative, and convergent) follow design theory articulated by the Design Research Society in London.¹¹

Divergence occurs when a team receives guidance and begins by tearing apart a problem or situation to develop a more complete understanding. Divergence includes asking questions and creating an understanding of the operational environment by looking at known facts and assumptions with skepticism. In this divergent phase, it is important not to limit the expertise to the field that seems most applicable.¹² Divergence seeks transformation. Transformation is the spark of insight, which illuminates the way forward for the designing organization. It is common for teams to become stuck in the divergent phase because they lack or have not developed the creative spark that will form the solution.

The transformative phase starts with a mass of divergent information and contrasts it with the current problem understanding to determine possible outcomes. The design team is ready to move forward from the transformative phase to the convergent phase in the form of a “design concept” once a series of unifying ideas and concepts have been developed and agreed upon.

The convergent phase is the one most familiar to the Army culture. In convergence, the design team must be intentionally reductionist and cast aside much of the information and products created during design creation to converge on a product and a singular understanding of a situation. Lacking any one of these cognitive phases, a design will not be complete. As Brigadier General (Retired) Wass de Czege states, “All people individually reason informally in similar fashion, consciously or not.”¹³ He began to explicate the Army’s current methodology in his discussion of meta-questioning, creation of strategic logic, and then concept narrowing.¹⁴

The ability to lead a design team through the cognitive stances of design is central to the concept of design control. Applying a loose structure or methodology to the design will aid in that difficult endeavor.

Design methods. In his book *How Designers Think*, Bryan Lawson calls design methods the “tactics of design.” The details of these methods are beyond the scope of this article. SAMS currently educates students on the theory and application of these creativity techniques as part of its design education. Field grade officers conducting design should study a few of these methods to enhance their creative ability. Two of the most commonly used design methods in the Army are “the narrative” and the use of “framing and reframing.”

Team composition. Many officers, when exposed to design, ask “At what level can this be accomplished?” and “How many people?” If design is considered a cognitive endeavor, it can be done at any level. However, for controlling design as an applied methodology, we can start to consider the proper composition of a design team. In fact there is no set size for a design team. Many design methods require a small group of four to six to understand a complex situation.¹⁵ On the other end of the spectrum, several authors believe that more is better.¹⁶ According to the social psychologist A. Paul Hare, writing about small groups in 1962, the design team

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leader must manage the five characteristics of a design team: group interaction, group goals, group norms, group direction, and the limits of group activities.¹⁷ The leader’s ability to manage these characteristics and still generate creative designs will determine the design team’s size.

The key to understanding design team size is an awareness of the different types of designers. There are three classes: core designers, proximate designers, and nondesigners. The core designers are permanently working on the design. Proximate designers are introduced, especially during divergence, to add to the multi-disciplinary view and assist with creativity. Patrick Feng identifies the third category, which are non-designers (clients, stakeholders, and other socially relevant groups and subject matter experts).¹⁸

Organizing the team is highly context-dependent and optimal organization may frequently change, based on which parties are present and the methods employed. Most traditional design authors recommend a core team of four to six designers; however, the leader must account for which design methods the team will apply. For example, brainstorming theory recommends 5 to 15 people.¹⁹ The key point is that understanding the different types of designers, the amount of mental agility required, and the context will allow the core designers to determine how much help from proximate or non-designers they can manage.

Use of the narrative. As the design team synthesizes information, knowledge, and understanding, there will commonly be a loss of knowledge. Dedication of a staff officer to create a written narrative *and* graphic representation of the environment during discussion creates a point of unification.²⁰ The written narrative and graphic products produced in a design effort will evolve and should address the environmental frame, the problem frame, and the design concept.

These representations change form as the design transitions from understanding the environment and

problem to solution development. The narrative becomes an essay, logically linking the guidance, the environment, the problem, and the areas for intervention in the form of a design concept. The narrative should capture deductions. For example, opportunities for intervention, dilemmas, tensions, and theories should all be captured in a narrative. This forces logic and sequence into the deductions of the design team. The narrative captures knowledge, serves as a tool to achieve shared understanding, and provides an anchor for further exploration and future exploitation. It may also either demonstrate the completeness of logic or reveal inconsistencies within the design writ large.

Framing and reframing. According to Martin Rein and Donald Schön, a frame is “a perspective from which an amorphous, ill-defined problematic situation can be made sense of and acted upon.”²¹ Framing a problem creates boundaries that control the information and can spark creativity.²² A “cognitive frame” is a theory that necessarily scopes the portion of the environment under consideration and defines the problem. As one author notes, “The choice of a conceptual frame will bring certain issues into focus while deliberately blurring distracting peripheral issues, and leaving most issues out of the frame entirely.”²³ Framing a complex problem is both natural and necessary before a design team can begin to develop a design concept to mitigate a situation.

A “reframe” is “restarting the design after discarding the hypotheses or theories that defined either or both the environmental frame or the problem frame.”²⁴ A “refinement” of the design concept that does not require a complete reexamination of the underlying theory is not a reframing. The decision to reframe or refine may come from the commander or from the design team when they reveal that one of the reframing criteria demands a fundamental change in approach or when they simply want to explore the problem from a different perspective. Once the designing leader determines his operational approach, he should monitor the situation and make refinements to the approach if required during the campaign. If the situation

eclipses the commander’s limits of tolerance or refinements can no longer correct the discrepancy, or refinements are required repeatedly, a reframe is in order.

One component of knowledge management is the development and tracking of reframing criteria. Reframing criteria can alert the commander that the understanding that defined the environmental frame or the problem frame itself has changed and is now incorrect.²⁵ When designing, the design team should track theories of understanding and action in their narrative.²⁶ Additionally, they should explicitly define what changes in the situation will require reframing. Things that would prove a theory of understanding false, which are predictable, are reframing criteria. The definitions of “reframing” and “refinement” are critical to managing information during design. Organizing a segment of the staff for tracking and displaying reframing criteria may reduce inappropriate assumptions and theories. The officer who undertakes design should incorporate organizational learning and reframing criteria into design strategy.

Communications. Currently, the Army is carefully considering how to codify the outputs of design. Obtaining shared understanding from any product, graphic, or narrative presents significant communications challenges. Therefore, the interface between designers and planners should be a continuous process, not merely a product exchange. Accurately sharing information requires adjustment



U.S. Air Force, TSGT Francisco V. Govea II

U.S. Army LTC William Clark, commander of 8th Squadron, 1st Cavalry Regiment, meets with village elders in Taktehpol, Afghanistan, 4 January 2010.

of our existing communications channels and feedback mechanisms already in mission command. This process should include multiple interfaces during the different phases of the design (exploration of the environmental space, problem space, and creation of the design concept). The medium for these interfaces should be discourse, graphical representations, and narratives presented during design formulation.²⁷

Achieving understanding among multiple actors requires a shift in how we communicate in the Army. This shift requires an increase in the communications channels and feedback mechanisms addressed in FM 6-0. PowerPoint briefings, written narratives, and even the design concept will not adequately share understanding. The commander must take responsibility for his own understanding and for developing the understanding of the design team and his unit. Therefore, the communication between the design team and the commander should be an evolving and continuous process tailored to the context, not a single product such as a briefing, narrative, or campaign directive. This requires the commander to consider blending the command and staff communications channels as FM 6-0 implies.²⁸ Transmission of the understanding from the design team to the commander, and vice versa, requires the Army to creatively engage multiple forms of communications beyond briefings and orders to increase understanding and harness organizational *intellect*.

Design-plan interface. Understanding the design-plan interface as a continuous process, instead of a product, also requires an increase in feedback mechanisms. FM 6-0 calls for multidirectional information exchange, while design calls for multidirectional exchange of understanding, which represents an increased challenge.²⁹ The Army's transition from planning to execution occurs during troop leading procedures. As plans are passed on to subordinate units, a variety of means, from warning orders to parallel planning, allow the planners to inform the executors. Similarly, the interface between the design team, planners, and commander should be a series of fluid interactions tailored to the situation. While this will be less process-intensive than troop leading procedures, it should be just as rigorous in application and must be scheduled in unit battle rhythms.

Industry describes these engagements as the "design charrette." The "charrette" (an architectural) is a meeting of core designers (the core design team

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of four to six skilled designers), proximate designers (members of the staff included in the design or others involved in the design), and nondesigners (individuals who provide input to the design, such as subordinate units, other stakeholders, or subject matter experts). The charrette participants create a shared understanding of a situation at one moment in time and record that understanding in both graphic and narrative format. Multiple charrettes over time enable the commander and staff to move toward a more enduring shared understanding recorded in an environmental frame, problem frame, and in the design concept.

The design concept. The design concept should include the concept of the environment, the problem, the logic of moving toward a desired end state, the operational approach, and implications for further planning and actions.³⁰ It should also include reframing and validation criteria for the theories and assumptions inherent in the current understanding. Finally, as the Army issue paper on design states, "Along with these deliverables, the commander provides his or her initial planning guidance given the implications of the design for employing the force."³¹ Acceptance of a format provides a concrete point of interface between the designers and the planners. However, the design concept should not stand alone, and iterative charrettes will communicate that understanding.

Recommendations

Examining design theory and methodology through the lens of FM 6-0, *Mission Command*, reveals several areas where the U.S. Army can improve its ability to discover, understand, and manage complex problems. While the commander remains central to design, planning, and action, he and the staff have to attain the same level of deep understanding of ideas to achieve the best outcomes.

The debate of "whether we will design" is no longer central. Intuitively, we will design, regardless, but the formal management framework inherent in designing

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approaches for complex situations will help achieve the best outcomes in our current operating environments. This approach is a cultural shift away from the “power leader model” and moves toward a corporate leader paradigm, where understanding and discourse flow freely within the unit.

The Army will continue addressing the world’s complex problems. Design as a methodology is in U.S. Army doctrine, along with other decision processes. As military professionals and stakeholders, we have a duty to hone the design skills as we fight and win the nation’s wars. **MR**

NOTES

1. Kent Keith, slideshow presentation on 27 March, CEO Greenleaf Center for Servant Leadership. Also found in Kent M. Keith, *Anyway: The Paradoxical Commandments* (New York: G.P. Putnam’s Sons, 2002).
2. Issue paper: “Army Design Doctrine,” 1-1.
3. U.S. Army Field Manual (FM) 6-0, *Mission Command: Command and Control of Army Forces* (Washington, DC: U.S. Government Printing Office [GPO], August 2003), paragraphs 2-25.
4. The need to reflect on events as they occur is as important in the military as in any profession. People tend to get caught in the action, and leaders must get above the fog of war to be able to see and address the entire problem. Ronald A. Heifetz and Martin Linsky, *Leadership on the Line* (Cambridge, MA: Harvard University Press, 2002), 51.
5. FM 3-0, *Operations* (Washington, DC: GPO, February 2008), para. 5-16 and 5-17.
6. *Ibid.*, para. 5-11.
7. Louis A. Dimarco, “The U.S. Army General Staff: Where is it in the Twenty-first Century?” *Small Wars Journal*, on <www.smallwarsjournal.com>, Small Wars Journal LLC, 2009, 2.
8. FM 6-0, 3-1.
9. *Ibid.*
10. Page developed a seven-step process which focused initially on analysis and then moved through a rigid process of evaluating different options with established criteria to minimize trial and error learning. Christopher Jones, *Design Methods* (Hoboken, NJ: Wiley, 1992), 149-55.
11. Jones.
12. In fact, the inclusion of multiple disciplines and organizations will often aid the divergent phase of design. Lawson notes, “It is interesting that some of the most famous inventions of modern times were made by people who had not been specifically trained to work in the field in which they made their contribution.” Bryan Lawson, *How Designers Think* (New York: Architectural Press, 1998), 10.
13. Huba Wass de Czege, “Systemic Operational Design: Learning and Adapting in Complex Missions,” *Military Review* (January-February 2009): 9.

14. *Ibid.*, 10.
15. Too many sources to list can be found in Opron Jones (1976), A. Paul Hare (1962) is probably the earliest work. Recent work would be in Stumpf and McDonnell (2002).
16. Lawson, several places, but note his design model on page 106.
17. *Ibid.*, 243. A. Paul Hare, *Handbook of Small Group Research* (New York: Free Press, 1962).
18. P.E. Vermaas, *Philosophy and Design: From Engineering to Architecture* (New York: Springer, 2007), 105.
19. As developed by Alex Osborn in 1941.
20. Narrative and discourse are well defined in Hayden White, *Tropics of Discourse* (Baltimore: Johns Hopkins University Press, 1986), 17.
21. Martin Rein and Donald Schön, “Frame-reflective policy discourse,” in *Social Sciences, Modern States, National Experiences and Theoretical Crossroads*, eds. Peter Wagner, Carol H. Weiss, Bjorn Wittrock, and Hellmut Wollman (Cambridge, MA: Cambridge University Press, 1991) 263.
22. D.A. Schön, *Reflective Practitioner* (New York: Basic Books, 1984), wrote about learning and cognition in a manner that heavily impacted the design community. “Problems, frames and perspectives on designing,” *Design Studies* 5(3): 132-36.
23. Stefan Banach and Alex Ryan, “Educating by Design,” *Military Review* (March-April 2009).
24. Issue paper: “Army Design Doctrine,” 29 March 2009, 2-12.
25. *Ibid.*
26. Jones, 171.
27. Charrette is a phrase common in design theory, and is a meeting of key stakeholders to share understanding and advance a design.
28. FM 6-0 indicates that of the command communications channel: “Commanders and authorized staff officers use them for command related activities.” FM 6.0, 3-18.
29. FM 6-0, 3-19.
30. Issue paper: “Army Design Doctrine,” 29 March 2009, 2-9.
31. *Ibid.*

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