The Relevance of the Commander's Estimate to The Army People Strategy

A Monograph

by

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Beginning in 2019 the US Army began focusing efforts in readiness, modernization, and reform. This came after nearly two decades of reacting to the immediate threat of counter-insurgency and engaging in small unit tactical actions. Foundational to executing these efforts is the Army People Strategy. This strategy focuses planning efforts to recognize and capitalize on the unique knowledge, skills, and behaviors of members of the Army, and how to best employ them. One of the critical enablers of this strategy is culture. The strategy outlines that current Army culture must be maintained while incorporating

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Abstract

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Beginning in 2019 the US Army began focusing efforts in readiness, modernization, and reform. This came after nearly two decades of reacting to the immediate threat of counter-insurgency and engaging in small unit tactical actions. Foundational to executing these efforts is the Army People Strategy. This strategy focuses planning efforts to recognize and capitalize on the unique knowledge, skills, and behaviors of members of the Army, and how to best employ them. One of the critical enablers of this strategy is culture. The strategy outlines that current Army culture must be maintained while incorporating new cultural elements to meet the challenges of the current operating environment. These elements include: inquiry and innovation, intellectual flexibility, knowledge sharing, systems thinking, and continuous learning. This study provides evidence to the relevance of the Commander's Estimate in the MDMP for developing the culture of US Army tactical organizations. This is accomplished through a case study of the creation of the Prussian General Staff along with the theories of generative learning and the theory of action for organizational learning.

Contents

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Abbreviations

ADM	Army Design Methodology
ADP	Army Doctrine Publication
ATP	Army Training Publication
FM	Field Manual
LSCO	Large Scale Combat Operations
MDMP	Military Decision Making Process
OA	Operational Approach
USACGSC	United States Army Command and General Staff College

Figures

Introduction

In 2019 the US Army began focusing efforts in readiness, modernization, and reform after nearly two decades of reacting to the immediate threat of counter-insurgency and engaging in small unit tactical actions. The US Army is poised through these focused efforts to successfully deploy, fight, and win in multi-domain operations (MDO) and excel in support of the Joint Force. The Army People Strategy is foundational for the US Army to execute these efforts.[1]

The 2019 publication of the Army People Strategy focuses planning efforts to recognize and capitalize on the unique knowledge, skills, and behaviors of members of the Army, and how to best employ them. Figure 1 depicts the strategy's strategic approach. To achieve the desired end state of the strategy, four critical enablers were established to set conditions for the execution of the lines of effort created to organize movement towards the desired strategic outcomes. One of the critical enablers is culture. The strategy outlines that the current Army culture must be maintained while incorporating new cultural elements to meet the challenges of the current operating environment. These elements include: inquiry and innovation, intellectual flexibility, knowledge sharing, systems thinking, and continuous learning.[2] How these cultural elements can be incorporated into US Army organizations through modifications to the current Military Decision Making Process (MDMP) is the problem this study seeks to solve.

[1] US Department of the Army, *The Army People Strategy* (Washington, DC: Government Printing Office, 2019), accessed 24 February 2020, https://www.army.mil/e2/downloads/rv7/the_army_people_strategy_2019_10_11_signed_final.pdf, 3.

[2] Ibid., 5, 9, 12.

Figure 1. Strategic Approach Through 2028. US Department of the Army, *The Army People Strategy* (Washington, DC: Government Printing Office, 2019), accessed 24 February 2020, https://www.army.mil/e2/downloads/rv7/the_army_people_strategy_2019_10_11_signed_final.pdf, 5.

Background

US Army planning and decision making has historically centered on situation estimates. During the Revolutionary War, Major General Von Stueben submitted "Estimates of the Situation" to General Washington to enable his decision-making.[4] The process to systematically develop these estimates, which evolved into the current US Army procedures for planning and decisions, is traced back to the creation of the Prussian general staff in the late 19th century.[5] In 1910, "Estimate of the Situation" became official doctrine with the publishing of Field Service

[4] James Hittle, *The Military Staff: Its History and Development* (Harrisburg, PA: The Military Service Publishing Company, 1944), 179.

[5] Ibid., 3.

Regulations that year.[6] US Army doctrine would continue to evolve over the next three decades considering the lessons learned from World War One. In 1940, the US Army published the first FM 101-5, *Staff Officers' Field Manual: The Staff and Combat Orders*. In this 1940 publication, the "Estimate of the Situation" was broke down into three parts: Commander's Estimate, Staff Estimate, and decision.[7] These portions created an integrated process between the commander and his staff to produce a decision for a course of action. FM 101-5 was revised eight times over the next five decades, with the last revision published in 1997. The planning process evolved significantly during that period, introducing the MDMP which is the current doctrinal process.

Significant changes occurred in 2003 with the publication of FM 6-0, *Mission Command: Command and Control of Army Forces,* and subsequently FM 5-0, *Command and Staff Organization and Operations.* These manuals introduced Mission Command, a concept from the 19th century Prussian military, as a doctrinal construct for command and control and removed the Commander's Estimate from the MDMP. The Commander's Estimate was reintroduced into doctrine with the 2010 publication of FM 5-0, but no longer as an input to the planning process. The 2019 publication of ADP 6-0 defines the Commander's Estimate as a mental process linked to the commander's visualization.[8] This study seeks to understand how developing a format for the Commander's Estimate and incorporating it into the MDMP can increase the cultural elements of inquiry and innovation, intellectual flexibility, knowledge sharing, and continuous learning throughout a tactical organization.

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[6] James Hittle *The Military Staff, Its history and development* (Harrisburg, Pa: The Military Service Publishing Company, 1944), 3.

[7] US Department of the Army, Field Manual (FM) 101-5, *Staff Officers' Field Manual The Staff and Combat Orders* (Washington, DC: Government Printing Office, 1940), 37.

[8] US Department of the Army, Army Doctrine Publication (ADP) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2019), 1-12.

Research Question

What is the relevance of the Commander's Estimate in the MDMP for developing the culture of The Army People Strategy in tactical organizations?

Methodology

This study is a review of history, theory, and doctrine. A historical case study examines the creation of the Prussian General Staff during the 19th century. This case study provides a contextual understanding of the factors that led to the reformation of the Prussian military and the creation of the general staff. This understanding provides insight into the necessary cultural elements for the US Army to execute Mission Command. Next, the study examines two theories. First, is generative learning theory which provides understanding of how commanders learn new information and what strategies are available to increase the transfer of knowledge to others.[9] The second theory is the theory of action perspective for organizational learning.[10] This theory examines the governing principles that are inherent to learning organizations. Lastly, this study reviews the evolution of US Army planning doctrine. This doctrinal review provides understanding of why the current doctrine is written as is and appreciation of the change of doctrine over time.

There are 5 chapters in this study. Chapter 1 is a literature review composed of research methodology, key sources, and significant conclusions. Chapter 2 provides the review of history and a case study on the formation of the Prussian General Staff. Chapter 3 is a US Army planning doctrinal review. Chapter 4 is a review of the theories of Generative Learning and Action Perspective. Lastly, Chapter 5 provides analysis and conclusions from the study with suggestions for future research.

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[9] M. C. Wittrock, "Learning as a Generative Process," *Educational Psychologist* 45, no. 1 (January 21, 2010): 41.

[10] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978).

Literature Review

Research Methodology

The research for this study was primarily conducted at the Combined Arms Research Library (CARL) at Fort Leavenworth, KS. Resources used at this location were the books available by the library's open catalog, and historical documents maintained in the closed stacks research area. A variety of online resource catalogs were used for this study, accessed was gained through CARL.

Key Resources

Seven key resources were used for this study. Key sources for the history review were *The Military Staff: Its History and Development* by James Hittle and *The Duties of the General Staff* by Major General Bronsart Von Schellendorf. All applicable US Army doctrinal manuals were a key source for the doctrinal review, along with Rex Michel's research report "Historical Development of the Estimate of the Situation". To review the theories in this study, the key sources used were M.C. Wittrock's journal article, "Learning as a Generative Process", and Chris Argyris and Donald Schoen's book, *Organizational Learning: A Theory of Action Perspective*.

In order to synthesize the reviews of history, doctrine, and theory the books, *The Scientific Way of Warfare* by Antoine Bousquet and *Transforming Command: The Pursuit of Mission Command in the US, British, and Israeli Armies* by Eitan Shamir were the key sources. Finally, John Boyd's "Destruction and Creation" presentation was a key source that drove the investigation and research behind this study.

What was learned and suggestions for current practice

This study determines that the Commander's Estimate is relevant for developing the culture of US Army tactical organizations. It recognizes that there must be modifications to the current format and how it is incorporated into the MDMP. This understanding developed two

suggestions for current practice. The first is that the Commander's Estimate format be modified to generate learning for the commander while providing staff and subordinates the process behind the commander's visualization. The second suggestion is that Commander's Estimate be employed into the MDMP similar to the current doctrine for the Army Design Methodology products, with the exception that the Commander's Estimate is published along with Warning Order 2.

Historical Case Study

The current US Army planning and command and control doctrine traces its origin back to the Prussian military in the 19th century. The Mission Command approach to command and control derives from the Prussian concept of Auftragstaktik (mission orders). The concept of Auftragstaktik and the creation of the Prussian General Staff came from a reformation of the Prussian military that significantly changed the culture within the organization. This reformation developed a culture of inquiry and knowledge sharing throughout the military. To develop an understanding of the current US Army doctrine, it is important to review of the origin of the current command and control. This case study shows how the Prussian military operationalized the use of estimates in culture of inquiry, intellectual flexibility, and knowledge sharing from the origin, formation, and implementation of the Prussian General Staff and the concept of Auftragstaktik.

The formations of the Prussian General Staff and the concept of Auftragstaktik is generally regarded as a result of the 1806 Jena Auerstedt campaign. During this campaign, the French Army, led by Napoleon, brilliantly defeated the Prussian Army. The Prussian military in 1806 was unable to compete with the military genius of Napoleon. The severity of the defeat led to a reformation of the Prussian military. An analysis of the organizational structures and systems in the Jena Auerstedt campaign that led to the Prussian defeat provides insight into the formation of the General Staff and the concept of Auftragstaktik.

Origin

In 1806, France was relishing in the victory at Austerlitz the previous year that abolished the Holy Roman Empire and created the Confederation of the Rhine.[11] Napoleon, as the Emperor of France, was seeking to expand France's power. Meanwhile Prussia took the opportunity to

[11] Michael Leggiere, *Napoleon and the Operational Art of War: Essays in Honor of Donald D. Horward* (Leiden, Netherlands: Koninklijke Brill, 2016), 174.

occupy the country of Hanover after the dissolution of the Holy Roman Empire. Prussia previously sought to avoid war with France but began to mobilize their forces against France after receiving information that Napoleon offered Great Britain Hanover's sovereignty to negotiate a trade deal.[12] Napoleon immediately initiated campaign planning after receiving the information of mobilized Prussian forces, looking to capitalize on the opportunity to defeat the Prussians in decisive battle. This strategic context led to what is known as the Jena Auerstedt campaign.

The Jena Auerstedt campaign began on October 8th 1806 as Napoleon entered Prussian territory with the French Grand Armeé. Moving in a battalion square formation with light cavalry and units of dragoons forward, Napoleon kept his force flexible to rapidly respond as the situation developed and prevented the Prussians from understanding French movements.[13] The Grand Armeé moved along a broad front to locate the Prussian forces amidst the fog of war. This allowed the Grand Armeé to maintain a high operational tempo, moving quickly without certain information on the location of the Prussian Army. After moving through the Franconian forest and into Saxon territory, Napoleon finally received reports of the location of the main Prussian forces on October 11th. With this information Napoleon transitioned his forces to concentrate for decisive battle.

Napoleon quickly issued orders in the early hours of October 12th for the Grand Armeé to pivot North-East and move to the vicinity of Jena and Auerstedt; the location of the Prussian Army. On the 13th of October the Prussians discovered that the French Army was near and threatening to envelop their forces. This resulted in a Prussian decision to attempt to retreat to the town of Auerstedt, while leaving a rear guard in Jena.[14] The decisive battle of this campaign occurred on October 14th in vicinity of the towns of Jena and Auerstedt. Napoleon remained

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[12] Michael Leggiere, *Napoleon and the Operational Art of War: Essays in Honor of Donald D. Horward* (Leiden, Netherlands: Koninklijke Brill, 2016), 174.

[13] Michael Krause and Cody Phillips, *Historical Perspectives of the Operational Art* (Washington DC: Center of Military History, 2010), 45.

[14] Ibid., 48.

unclear as to the exact disposition of the Prussian forces, but continued to fight for better understanding.[15] After ten hours of fighting, the French Army had largely routed and annihilated the Prussians.[16] This battle led to a French pursuit of the remaining Prussian forces and an end to the campaign. Ability gaps in planning, information, and decision-making were significant causes of the success of the French and defeat of the Prussians.

The initial planning efforts for both belligerents greatly affected the outcome of the campaign. The Prussians initially determined to go to war with France in August 1806, but it was not until September 27th that the Prussian war council finally decided on a war plan. This plan would change drastically a few days after October 5th.[17] Alternatively, Napoleon did not receive intelligence that the Prussians had begun mobilizing forces until sometime in September, but by October 8th he had already planned, mobilized, and initiated movement. This significant difference in planning ability is a result of the Prussian Army being structured around an indecisive war council with a weak staff that could not provide detailed information. This planning failure would demonstrate to the Prussians the need for estimates to frame the current problem in order to guide the gathering of detailed information during planning and the ability process this information quickly; leading to the creation of the General Staff.

The lack of decision-making in the Prussian military was a second cause of the campaign outcome. The Prussian military relied solely on a centralized war council to make decisions, causing large delays in execution as information changed during the campaign. On October 5th the war council received information that Napoleon had mobilized and prepared to invade Saxony.[18] It would be days before the war council could make the decision to act on this

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[15] Carl Von Clausewitz, *On War*, ed. and trans. Michael Howard, Peter Paret (Princeton, NJ: Princeton University Press, 1984), 102.

[16] Michael Leggiere, *Napoleon and the Operational Art of War: Essays in Honor of Donald D. Horward* (Leiden, Netherlands: Koninklijke Brill, 2016), 195.

[17] Michael Krause and Cody Phillips, *Historical Perspectives of the Operational Art* (Washington DC: Center of Military History, 2010), 38.

[18] Ibid., 38.

information. Napoleon also made decisions through a completely centralized process; but due to his ability as a military genius and his experienced staff he was able to process information and deliver orders quickly. After this campaign the Prussians understood a military genius like Napoleon was extremely rare. Napoleon had a unique ability to develop a detailed visualization of the battlefield from subordinate reports and communicate that visualization through orders. The Prussians would restructure the military and develop system to enable information processing and orders created quickly.

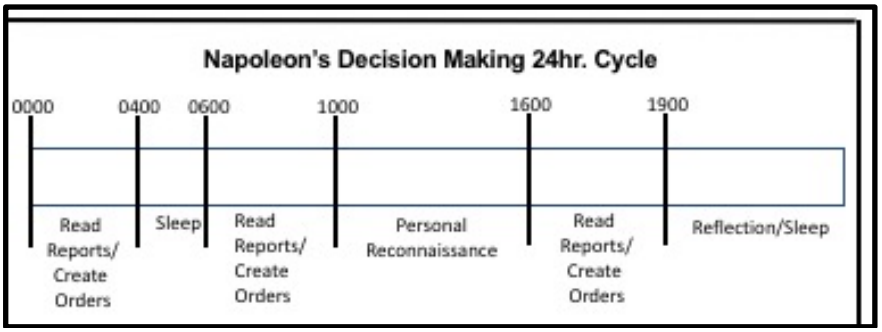

Figure 2. Napoleon's 24hr Decision Making Cycle. Created by Author. Michael Krause and Cody Phillips, *Historical Perspectives of the Operational Art* (Washington DC: Center of Military History, 2010), 29-30.

The use of information was a third gap that was decisive for the campaign outcome. Napoleon had a greater advantage in the ability to collect information with the movement formations of the Grand Armeé, allowing him to spread out his subordinate units. Additionally, he had a system for information flow throughout the army, enabling significant shared understanding for an organization of that size during that time in history. The application of this information was reliant on a central node; the brain of Napoleon. This enabled orders to be produced from a single mental model developed by a military genius that had a near perfect visualization of the battlefield.

This campaign demonstrates the military genius of Napoleon and the blatant weaknesses of the Prussian military structure in 1806. Napoleon's ability to command and control an army of 200,000 men spread out of 200 kilometers was a feat beyond the capabilities of his opponents. Napoleon's command and control was aided by his understanding of information flow and his

ability to make good decisions quickly. Understanding Napoleon's ability in contrast to their military failures would be a key to the reformation of the Prussian military. Napoleon's military genius allowed for shared understanding within his organization, even in centralized command and control system. Understanding that military geniuses are extremely rare, the Prussian military reformation sought to develop a system that would decentralize the command and control structure by implementing the elements of inquiry, knowledge sharing, and continuous learning into their culture.

Formation

The origin of the Prussian General Staff traces back to the Brandenburg Army of 1635.[19] The army commanded by Frederick William, the founder of the Prussian state, had a staff of twelve officers. These officers were in positions of: Master of Ordnance, General of Commissary, General Wachtmeister (similar to an operations officer), Adjutant General, Judge Advocate, Quartermaster, Paymaster, Chaplain, and Field Surgeon.[20] This staff accomplished their specified tasks for the commander of the Army. It would be 100 years before the Prussian Army saw significant development in their staff organization.

The Prussian General Staff saw two significant developments under the oversight of Frederick Great. In 1758, Frederick published instructions for his field engineers to survey ground, find and establish roads for troop movements, and perform reconnaissance of enemy camps and positions.[21] This was revolutionary for a commander to use his staff to both gather intelligence and conduct operations for the benefit of the army. With the increase of responsibility to his staff Frederick the Great also had higher expectations of the intellect of the officers on his staff.

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[19] James Hittle, *The Military Staff: Its History and Development* (Harrisburg, PA: The Military Service Publishing Company, 1944), 51.

[20] Ibid., 52.

[21] Ibid., 56.

Frederick the Great's second key development of the Prussian staff came in 1765 with the founding of the "Academie des Nobles", a school to train young wealthy men for military service. Frederick founded this school as a result of the declining education of his officers within his army after the Seven Years' War between 1756-1763.[22] This school was the predecessor to the Kriegsakademie, a key part of the reformation after 1806 that led to the Prussian General Staff.

The Prussian staff continued to evolve and develop over the next few decades. This changed with the death of Frederick the Great in 1786. The Prussian military then began to regress. This Prussian regression corresponded to the French Revolution beginning in 1789 and the rise of Napoleon as the great military power in all of Europe. It was these factors along with the strategic context already discussed that led to the failures in the Jena Auerstedt campaign in 1806.

After the failure in 1806 the Prussian Army appointed Major General Scharnhorst to head a commission of reorganization of the Prussian Army in 1807.[23] Scharnhorst was a member of the general staff during the Jena Auerstedt campaign, giving him first-hand knowledge of the adjustments and corrections that needed to be made. This reformation made four changes that are important to the scope of this study.

The first key change resulted from orders issued by Scharnhorst in 1808 that developed the General Staff to be composed of 26 officers and were regulated by instructions approved by the king himself.[24] These instructions were followed up with a policy implemented in 1809 which positioned General Staff officers at Army headquarters. This policy assigned the General Staff officers directly to the Commanding General, and not the organization. This significantly improved the development of the relationships and attitudes of General Staff Officers. The

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[22] James Hittle, *The Military Staff: Its History and Development* (Harrisburg, PA: The Military Service Publishing Company, 1944), 57.

[23] Ibid., 65.

[24] Bronsart Von Schellendorff, *The Duties of the General Staff*, 4th ed. (London, England: Harrison and Sons, 1907), 24.

exclusive relationship between the commander and his general staff produced an environment where the public testing of ideas was allowed and created an emphasis on inquiry.

This sense of independence and exclusiveness increased with the attendance of schools; as education was the second key change in the reorganization. Scharnhorst focused on the education of officers, opening three schools for junior officers and reinvigorating the Kriegsakademie, the school for field grade officers. The design of these schools focused on generating knowledge within the students, not the transfer of information. War games and map board exercises focused on the student's decision-making abilities and were followed with questions on how they applied the information learned in school. This education required officers to question their own mental models and reflect on their decisions. This produced officers with intellectual flexibility and personal mastery in the art and science of war. The Prussian military would increase the level of mutual trust within the entire organization by spreading these highly useful officers across the formations.

In 1828 with an understanding of the usefulness of a General Staff a directive was issued creating field staffs down to the Corps level. Additionally, these staffs organized into four sections: General Staff, routine staff, legal, and departmental or intendance.[25] This is a significant development as breaking the staff into elements responsible for certain information and at different echelons reflected the environment of mutual trust in the organization, as individuals were now relied on to be experts in certain areas. By organizing the staff into different sections, the commander is enabled to obtain different perspectives of the battlefield. This created environment of dialogue to generate shared understanding of the battlefield through knowledge sharing and further developed a culture of inquiry and knowledge sharing.

A final important development in the Prussian military reorganization is giving the Chief of Staff for each organization a dual command with the Commander. This eliminated the concept

[25] James Hittle, *The Military Staff: Its History and Development* (Harrisburg, PA: The Military Service Publishing Company, 1944), 70.

of a Chief of Staff being subordinate to the commander, but as a partner in command. The commander had the final responsibility in the decision making, but both the commander and chief of staff shared in the outcome. This relationship empowered chief of staff to have a discourse with the commander and challenge his ideas. These four developments along with many other changes throughout the Prussian military created a revolutionary and highly effective organization. This organization now had the ability to produce a visualization of the battlefield through a combining multiple perspective and developing shared understanding. It was Helmuth Von Moltke that harnessed this organization along with additional system processes to use it to lead Prussia to victory on battlefields filled with uncertainty.

Implementation

Helmuth Von Moltke became the Chief of the General Staff in 1858.[26] This appointment came after a rise through the ranks of the general staff, having never held a command position in his career that began in March 1822.[27] During his time as the Chief of Staff, Moltke led the Prussian military in the wars of unification and against France in 1871. These wars were a key display of military achievement. While there is debate on the leadership abilities of Moltke and his understanding of strategy, he implemented organizational processes that were effective and key to Prussia's battlefield victories during his time as Chief of Staff. Three important pieces of the processes Moltke implemented into the Prussian military were mission orders, the use of estimates, and prioritizing communication.

By the latter half of the 19th century technology made command and control at the division and corps levels increasingly difficult. New technology created a rapidly changing battlefield, making it difficult for detailed orders to reach forward units in a timely manner. Subordinates needed to understand what needed to be done not how to do it. Moltke

[27] Terence Zuber, *The Moltke Myth* (Lanham, MA: University Press of America, 2008), 15.

accomplished this using mission orders.

The concept of using mission orders, or what is widely known as Auftragstaktik, sought to increase the independence of subordinate commanders by operating from senior commander's guidance of a given mission/task and the overall intent. This was opposed to specific instructions to subordinates on how to accomplish a mission. This concept was based on the idea that continual tactical successes would lead to strategic victory. Moltke argued for this concept by stating the division and corps commanders must be able to understand their organization's current situation and make corresponding independent decisions within the intent of the overall mission.[29] He further backed this argument with the theory that war cannot be conducted without rapid decision, audacious risk, and independence of commanders.[30] These commanders made decisions from the use of estimates; operationalizing the culture of knowledge sharing and continuous learning. This is a second key process implemented by Moltke.

Moltke understood once enemy contact occurred any developed plans would quickly collapse. For this reason, Moltke wanted Prussian Commanders to make their decisions from estimates of the current situation within the overall intent of the mission. Acknowledging the fog of war, Moltke instructed that estimates must identify what is known, and what is unknown, and then derive a decision from that knowledge.[31] These estimates were based on understanding the current situation with regards to both friendly and enemy elements. Having commanders continually develop and maintain situation estimates was not only important for decision making but to generate shared understanding across the entire organization as well. With the combination of shared understanding and intellectual flexibility commanders were able to detect and fix errors in their own estimates creating a better visualization. This updated visualization produced an

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[29] Helmuth Von Moltke, *Moltke on the Art of War: Selected Writings*, ed. and trans. Daniel J. Hughes, trans. Harry Bell. (New York, NY: Ballantine Books, 1993), 131.

[30] Ibid., 77.

[31] Helmuth Von Moltke, *Moltke on the Art of War: Selected Writings*, ed. and trans. Daniel J. Hughes, trans. Harry Bell. (New York, NY: Ballantine Books, 1993), 93.

accurate intent; allowing subordinates to make better decisions.

Communication was an essential element for success to Moltke and the design of the Prussian military using mission orders. Moltke was heavily aided by the advance in technology and the introduction of the telegraph to communicate with his subordinates and allow subordinates to communicate with one another. Moltke stressed to commanders to understand the situation as a whole and communicate updates of changes in situation. While the changes may not be important to those directly influenced; it could be significant to others or to the whole.[32] This meant that commanders had the responsibility to synthesize the information given from their staffs, and then share it with other commanders. These different perspectives were important to the success of mission orders, if subordinate commanders deviated from the initial concept the higher commander needed to be notified as soon as possible. This enabled the army to exploit a tactical success or to rearrange combat power as the situation changed.

In conclusion, the formation and implementation of the Prussian General Staff and the concept of Auftragstaktik were created to compete the with the abilities of a military genius to visualize a rapidly changing battlefield and dictate that visualization through orders. Napoleon had the rare ability to develop a detailed visualization of the battlefield through generating learning from his subordinates across the battlefield. Understanding the rarity of a commander like Napoleon the Prussians reformed their military developing an organization where officers challenged their mental models. This led to an environment of public testing of ideas created by dialogue between a commander and his staff as depicted in Figure 2. The use of estimates by both the commander and his staff was an integral component of the organizational system as they were used to share perspectives and personal visualizations. In order to execute a command and control approach similar to Auftragstaktik, like mission command, then a commander's estimate is a relevant and vital component to creating shared understanding.

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[32] Helmuth Von Moltke, *Moltke on the Art of War: Selected Writings*, ed. and trans. Daniel J. Hughes, trans. Harry Bell. (New York, NY: Ballantine Books, 1993), 184.

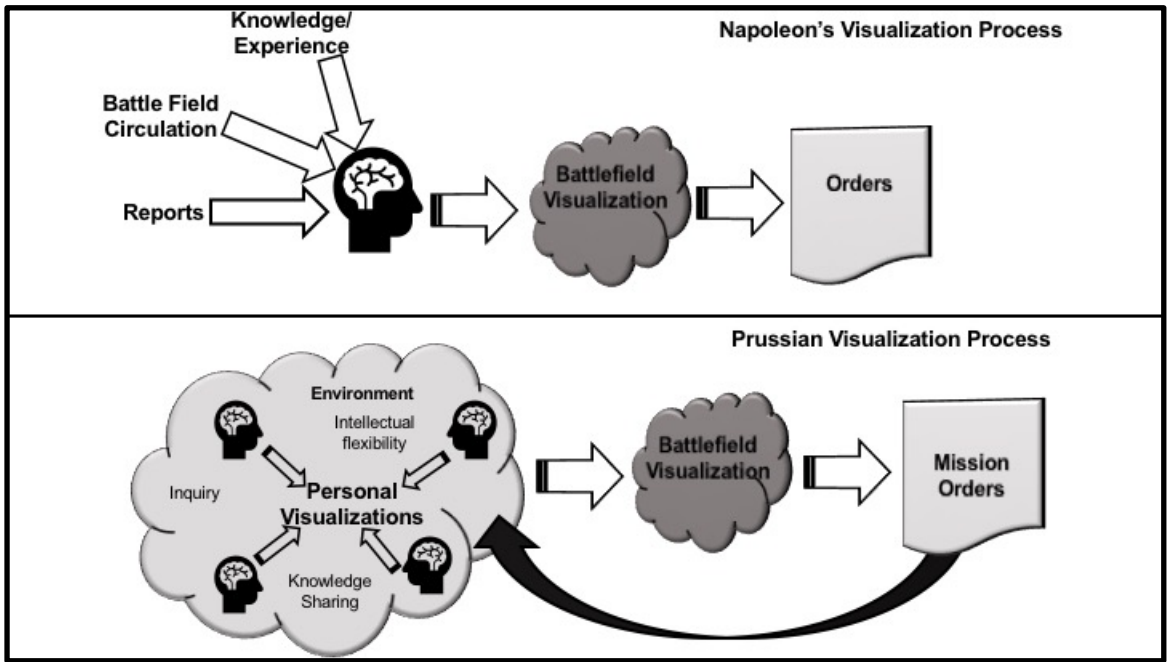

Figure 3. Comparison of Visualization Processes. Created by Author.

Doctrine Review

The origin of the US Army's operations process dates back to the writings of a young Captain in Fort Leavenworth, Kansas in 1909. Captain Roger S. Fitch published "Estimating Tactical Situations and Composing Field Orders" which turned into Army doctrine in 1910. This gave the first sequential methodology for developing tactical situational estimates.[33] Captain Fitch's writing provided a form for a five-paragraph field order that is similar to the one used today. An "estimate of the situation" developed by the commander provided the base of the field order. The estimate was a logical process of thought that enabled one to arrive at a definite tactical decision.[34] The process to develop an "estimate of the situation" evolved as the US Army published the first staff officer manual. Captain Fitch's "estimate of the situation" followed a logical sequence of estimates on: the mission, the enemy, friendly troops, terrain, time and space, methods (courses of action), and decision.[35] This structure is still the framework that is used for the MDMP today. To reach this current format, US Army doctrine evolved greatly over the years. This doctrinal review finds the US Army operations process has evolved from analytical deduction to sequential analytical deduction to the current doctrine of both inductive and deductive reasoning in the MDMP. This is seen through the introduction of staff estimates, sequential MDMP, and the introduction of the Mission Command approach to command and control.

In 1932 the US Army published the first manual for staff officers. This manual detailed the commander's estimate as a process to develop the five paragraph field orders. This publication indicated that the steps for the commander's estimate were to provide a "train of thought" and that in division and smaller units, the commander's estimate would generally be a

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[33] John Siegle, "Estimate of the Situation" (USAGSC Student Paper, 1966), 5.

[34] Ibid., 1.

[35] Roger Fitch, *Estimating Tactical Situations and Composing Field Orders*, (Fort Leavenworth, KS: Staff College Press, 1909), 8.

"mental process".[36] This idea of the commander's estimate being a mental process continued throughout the evolution of US Army doctrine. In contrast, much of the rest of the US Army planning process would change significantly, especially eight years later in 1940.

In 1940, Army Chief of Staff George C. Marshall published FM 101-5, *Staff Officer's Field Manual, The Staff and Combat Orders*. This manual provided a detailed methodology for developing the estimate of the situation which was used to produce plans. In this manual the estimate of the situation is composed of three parts; the commander's estimate, the staff estimate, and a culminating paragraph on the decision that was made.[37] Plans were developed from a decision based on an estimate of the situation. The format for the Commander's Estimate includes five paragraphs: Mission, Situation and possible lines of action, analysis of opposing lines of action, comparison of own lines of action, and lastly a decision. This format remained generally the same through the subsequent revisions of FM 101-5. This reveals an important evolution in US Army doctrine. In previous staff officer manuals the staff's purpose was to provide information to feed the commander's estimate; with the introduction of this manual the staff was enabled to provide alternative perspectives to enable the commander a broader perspective. This system provided the opportunity to create an environment of discourse, allowing for continuous learning and requiring commanders to have intellectual flexibility. This process used deduction to reach a decision based on the current estimates of the situation, but it can be inferred that commanders had to use inductive reasoning when reaching a decision through the alternative perspectives of the staff.

The purpose of the staff and the operations process remained unchanged in the first and

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[36] Paul A. Gade, Jonathan D. Kaplan, and Nicole M. Dudley, "The U.S. Army Research Institute for the Behavioral and Social Sciences.," in *Psychology in the Service of National Security.*, ed. A. David Mangelsdorff (Washington, DC: American Psychological Association, 2006), 185–197, Accessed October 29, 2019, http://content.apa.org/books/11470-013.

[37] US Department of the Army, Field Manual (FM) 101-5, *Staff Officers' Field Manual: The Staff and Combat Orders* (Washington, DC: Government Printing Office, 1940), 125.

second revisions of FM 101-5 in 1950 and 1954. Minimal changes were made to the operations process and the commander's estimate. The 1950 version of FM 101-5 promoted the idea of continuous learning stating that the commander's estimate must be a continuous process that is updated as situations changes to allow for a decision to continue the current course of action or determine a new action. Additionally, this version detailed that the thoroughness of a commander's estimate should be based on time available.[38] In 1954, FM 101-5 provided a different format for commander's estimates dependent on whether the type of command was administrative or tactical; however the general concept remains unchanged. The creation of different formats based on the type of environment and the understanding of a time constraint was a sign that the use of the Commander's Estimate to drive a decision was becoming infeasible. The amount of information a staff was able to provide a commander was becoming overwhelming and it was becoming difficult for a commander to use analysis and deductive reasoning to determine a course of action. The 1954 version of FM 101-5 is the final version where the operations process can be seen as a singular deductive process.

The third revision of FM 101-5 produced in 1960 is a second significant point in the evolution of the US Army's operations process. This FM 101-5 presented a sequential decision-making process, called "sequence of actions in making and executing decisions".[39] This 10-step process is the start of the evolution into the MDMP steps that are present in current doctrine. The commander's estimate remained an important step in the sequence, as the fifth step. This publication is significant in the evolution of the operations process as the process for making decisions becomes an iterative deductive process. The staff and commander estimates provide analysis from individual perspectives on possible courses of action. From these analysis, a

[38] US Department of the Army, Field Manual (FM) 101-5, *Staff Officers Field Manual Staff Organization and Procedure* (Washington, DC: Government Printing Office, 1950), 60-61.

[39] US Department of the Army, Field Manual (FM) 101-5, *Staff Officers Field Manual Staff Organization and Procedure* (Washington, DC: Government Printing Office, 1960), 55.

hypothesis would be chosen from which a second round of analysis occurs to create a decision. A fourth revision of FM 101-5 was produced in 1968. This publication provided an example commander's estimate that was eleven pages in length. This extremely detailed commander's estimate displays that the evolution of US Army doctrine was not aligning with the current technology of the time and the amount of information that was readily available to a Commander and his staff. The Commander's Estimate at this time was still an analytical tool to attempt to determine the best course of action; but with technology it was needed to evolve to be inductive process to understand the situation.

In 1964, the United States Army Command and General Staff College (USACGSC) conducted a study among the current class of US Army officers to determine the usage of the Commander's Estimate among the force. This study found that 59.3 percent of the students that had previously served on division staff reported the Commander's Estimate (format) was hardly or never used. An additional 57.5% of the students reported that they did not plan on using the estimate format after graduation.[40] These students and the organizations they came understood that the Commander's Estimate no longer has utility as an analytical process, but doctrine had not evolved to produce a helpful solution. Additionally, the culture in the Army was ingrained to reach decisions through deductive analysis that it would become extremely difficult to bring change.

There would be small evolutions in the operations process over the next three decades. The 1984 version introduced the term the Military Decision Making Process maintaining the same approach as the previously titled "sequence of actions in making and executing decisions". The seventh and final version of FM 101-5 was published in 1997. This publication initiated a significant change in operations process, attempting to combine inductive and deductive reasoning in the MDMP.

[40] Williams Hollis, "A Revised Commander's Estimate", *Military Review* (Fort Leavenworth, KS, 1976), 50.

The 1997 version of FM 101-5 did not provide a format for the Commander's Estimate, but developed the concept that estimates support the commander's visualization and that subordinate commanders must be able to envision the organization's end state. This evolution used the Commander's Estimate for inductive reasoning to synthesize information and generate a visualization. Without a format commanders were expected to be able to develop a visualization of the battlefield in private, and subordinates would not know when the current environment no longer aligned with the commander's visualization. This shift in adding inductive reasoning foreshadows the next key point in the evolution of the operations process with the introduction of Mission Command.

After the 1997 publication of FM 101-5 the doctrine on the US Army operations process was divided into FM 6-0 and FM 5-0. FM 6-0, *Mission Command: Command and Control of Army Forces,* published in 2003, doctrinally incorporated the concept of Mission Command for the first time. This concept for command and control was stated to originate from the Prussian concept of Auftragstaktik, by decentralizing control and allowing subordinates to operate from the commander's intent. Subsequently, in 2005 the first FM 5-0, *Army Planning and Orders Production* was published. FM 5-0 is built on two main ideas: Commanders are responsible for planning, and effective planning incorporates the concept of Mission Command.

This FM 5-0 removed the Commander's Estimate from the decision-making process. It focused the commander on providing a description of his visualization, which is a product of inductive reasoning, through different outputs of the planning process. This visualization is the: Mental process of achieving a clear understanding of the force's current state with relation to the enemy and environment and developing a desired end state that represents mission accomplishment and the key tasks that move the force from its current state to the end state. [41]

[41] US Department of the Army, Field Manual (FM) 5-0, *Army Planning and Orders Production* (Washington, DC: Government Printing Office, 2005), 1-9.

It is described through commander's intent, planning guidance, and Commander's Critical Information Requirements (CCIR), which are all products of the MDMP. While this doctrine attempted to continue to implement inductive reasoning into the MDMP it did not provide commanders an opportunity to display the process used to come to their conclusions. This increased the hierarchy of US Army organizations instead flatting the organization like the Prussians during their reformation. Commanders now independently created a visualization providing only descriptions of the visualizations in pieces throughout the MDMP. The staff and subordinates were then to operate under the visualization without an understanding of the process used by the commander to develop it. While this doctrine shifted the US Army to an inductive-deductive approach to the operations process, it failed to develop the organizational culture necessary to execute Mission Command. This added hierarchy in organizations decreases a culture of inquiry while inhibiting shared understanding.

The first revision of FM 5-0 in 2010 brought back the Commander's Estimate, retitling it as the Commander's Running Estimate but did not provide a format. In this version the estimate is used as a summary of the problem and all the variables that affect the mission, which is inductive reasoning, and is to supplement the staff estimates. This reintroduction of the Commander's Estimate did not undo the fabricated hierarchy that was created in 2005. In doing so organizations continued to be provided with a description of the commander's visualization without understanding the process used to create it. These concepts are primarily unchanged in the doctrine that is current today.

FM 6-0, *Commander and Staff Organization and Operations* published in 2014 is the current doctrine providing tactics and procedures for exercising mission command.[42] It describes a commander's running estimate as the summary of the problem and an integration of the

[42] US Department of the Army, Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Government Printing Office, 2014), vi.

information and knowledge of the staff and subordinate commander's running estimates. This running estimate is to be used to consolidate a commander's understanding and visualization of an operation.[43] The commander's running estimate is not discussed in the steps of MDMP; leaving its utilization according to the current doctrine as a process for developing the commander's visualization privately.

The current US Army doctrine publication for planning is ADP 5-0, *The Operations Process*. This publication describes the fundamentals of planning and how they fit within the guidelines of Mission Command, the US Army's approach to command and control. Throughout the operations process, the commander provides a fundamental role, and doctrinally is the most important participant within the process.[44] The commander must continue to understand, visualize, describe, and direct to drive the operations process. ADP 5-0 states the commander's estimate is the mental process tied directly to the commander's visualization and defines the commander's visualization as the mental process of developing situational understanding, determining a desired end state, and envisioning an operational approach by which the force will achieve that end state.[47] Figure 3 depicts this visualization process. While using Commander's Estimate to develop a visualization to drive the operations process represents a large evolution from the deductive reasoning used in 1909, it fails to develop culture of inquiry and innovation, knowledge sharing, and intellectual flexibility.

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[43] US Department of the Army, Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Government Printing Office, 2014), 8-1.

[44] US Department of the Army, Army Doctrine Publication (ADP) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2019), 1-8.

[47] US Department of the Army, Army Doctrine Publication (ADP) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2019), 1-8, 1-12.

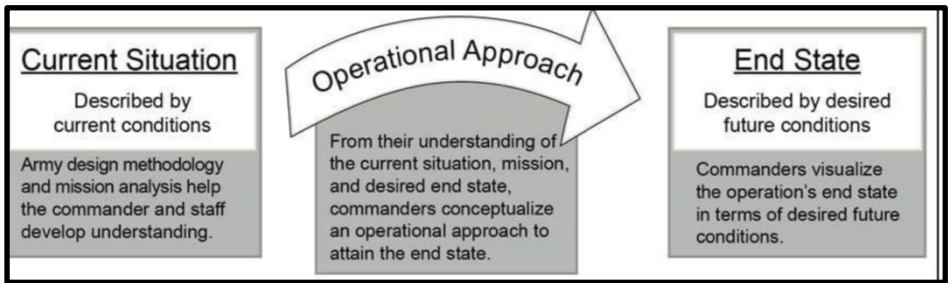

Figure 4. Commander's Visualization. US Department of the Army, Army Doctrine Publication (ADP) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2019), 1-9.

In 1909 the commander was intimately involved in developing a course of action through deductive reasoning for his organization to execute their mission. This evolved to creating a system of sequential deductive analysis with the help of the staff. This system became inadequate to process the information available through developing technology. With the introduction of Mission Command, the US Army attempted to replicate the system used by Prussians in the 19th century. This replication failed to understand the necessary cultural conditions the organizational system needed to develop. Doctrinally, the commander is the most important position in the MDMP and is to provide the synthesis of the analysis done by the staff through inductive reasoning. This review has shown that the current structure does not provide organizations with the opportunity to display the commander's process in his inductive reasoning. Causing missed opportunities to learn effectively or to detect errors in commander's mental models. To develop a culture of inquiry, knowledge sharing, and intellectual flexibility organizations must have environment that allows the public testing of ideas. This includes the process used by the commander to develop his visualization. This additionally creates shared understanding and develops mutual trust which are key principles in executing Mission Command. The next chapter provides strategies for commanders to generate learning while developing their visualization and models to understand organizational learning.

Generative Learning Theory Review

The previous section of this study examined the evolution of the US Army's operations process doctrine and the Commander's Estimate. What once started as a form for deductive analysis evolved to an inductive process for the private development of a visualization. The section ended with the idea that a commander needs strategies to generate learning while formulating his visualization. This study examines a theory of how humans learn to be able to find applicability for commanders and staffs in order to produce a culture of inquiry and knowledge sharing.

There are two main schools of thought on how humans learn, cognitive theory and stimulus response theory. Cognitive theory postulates that learning comes from a person perceiving and reorganizing thoughts and ideas from an experience. It is the formation and modification of cognitive patterns in relation to their environment.[49] In contrast, stimulus response theory states that learning comes from a human responding to a stimulus. This theory focuses on creating learning environments that cause a stimulus that generates a positive response to the learner.[50] Within each of these schools of thought are theories that attempt to provide a deeper understanding of how humans learn.

Within the cognitive theory school of thought is generative learning theory. Generative learning theory attempts to explain how humans best learn. This study examines this theory to understand its applicability to the MDMP and the relevance of the commander's estimate. The theory is examined by explaining what it is, what it means, and how this theory can be applied to developing strategies to enable learning.

What it is

[49] Peter Holland. "Cognitive versus Stimulus-response theories of learning", *Learning & Behavior* 36, no. 3 (2008): 1, https://doi.org/10.3758lb.36.3.227

[50] Ibid., 1.

Generative learning theory was first introduced in 1974 through an article written by M.C. Wittrock, an American educational psychologist. His theory was that people generate perceptions and meanings that are consistent with their prior knowledge.[51] Wittrock developed his theory based on neural science. From his neural research he discovered that the brain functions actively and dynamically to construct meaning from experiences as opposed to passively receiving and recording information.[52] From his understanding of neuroscience, Wittrock perceived the brain as a model builder, something that controls processes.

These processes generate meaning, making sense of experience and responding to perceived realities. There are four processes that occur during learning according to the generative learning theory: motivational, learning, knowledge creation, and generation. Within generative learning theory, comprehension and understanding is a result of these processes; generating relations between previous knowledge and new information.[54] From this theory Wittrock developed a generative learning model to be able to test his theory of learning. According to Wittrock, the generative learning model:

> Predicts that learning is a function of the abstract and distinctive, concrete associations which the learner generates between his prior experience, as it is stored in long-term memory, and the stimuli. Learning with understanding, which is defined by long-term memory plus transfer to conceptually related problems, is a process of generating semantic and distinctive idiosyncratic associations between stimuli and stored information.[55]

Wittrock originally used this model to test his theory by conducting numerous experiments with both elementary school children and college students. During these studies Wittrock examined multiple control groups where one would be required to generate information

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[51] M. C. Wittrock, "Learning as a Generative Process," *Educational Psychologist* 45, no. 1 (January 21, 2010): 41.

[52] Merlin C. Wittrock, "Generative Learning Processes of the Brain," *Educational Psychologist* 27, no. 4 (September 1992): 533.

[54] Wittrock, "Generative Learning Processes of the Brain.", *Educational Psychologist* 27, no. 4 (September 1992): 532.

[55] M. C. Wittrock, "Learning as a Generative Process," *Educational Psychologist* 45, no. 1 (January 21, 2010): 41.

of recently read or viewed material and the others were instructed to reproduce the information or create an organized outline of the information.[56] These studies found that the control group that was required to generate new information produced the best scores for memory recall, retention, and comprehension of the information.[57] Numerous other studies have been conducted to test generative learning theory. The general conclusion from these studies is that learning is enhanced when the learner can be active and dynamically involved in the creation of knowledge.[58] The conclusions from the studies testing generative learning theory produce meaningful implications for approaches to and structure for enabling learning.

What this means

The analysis of the generative learning theory case studies produced the call for action that to improve learning, teachers must focus on how relationships among concepts and experience are constructed while still structing new information in an organized format.[59] This means that to create generative learning, learning must center on the student to be able to actively construct meaning. This is a more structured approach to discovery learning; creating an environment where students can manipulate or generate information and then have the opportunity to test the relationships of prior knowledge and new information that they have created.[60] This theory implies that commanders must be active in learning and then have an environment to test that learning.

To provide a framework of how to understand how learners are making sense of

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[56] M. C. Wittrock, "Learning as a Generative Process," *Educational Psychologist* 45, no. 1 (January 21, 2010): 42.

[57] Ibid., 42.

[58] Wilhelm-Chapin and Koszalka, "Generative Learning Theory and Its Application to Learning Resources.",5.

[59] Merlin C. Wittrock, "Generative Learning Processes of the Brain," *Educational Psychologist* 27, no. 4 (September 1992): 536.

[60] Hyeon Woo Lee, Kyu Yon Lim, and Barbara L Grabowski, "Generative Learning: Principles and Implications for Making Meaning," in *Handbook of Research on Educational Communications and Technology* (New York: Springer-Verlag, 2008) , 122.

information, Wittrock provided nine principles for the teaching of generative comprehension, summarized in Figure 3.[61] By abiding to these principles, one can begin developing an approach to creating an environment that results in generative learning. With an approach one can formulate a plan of action by incorporating strategies for generative learning.

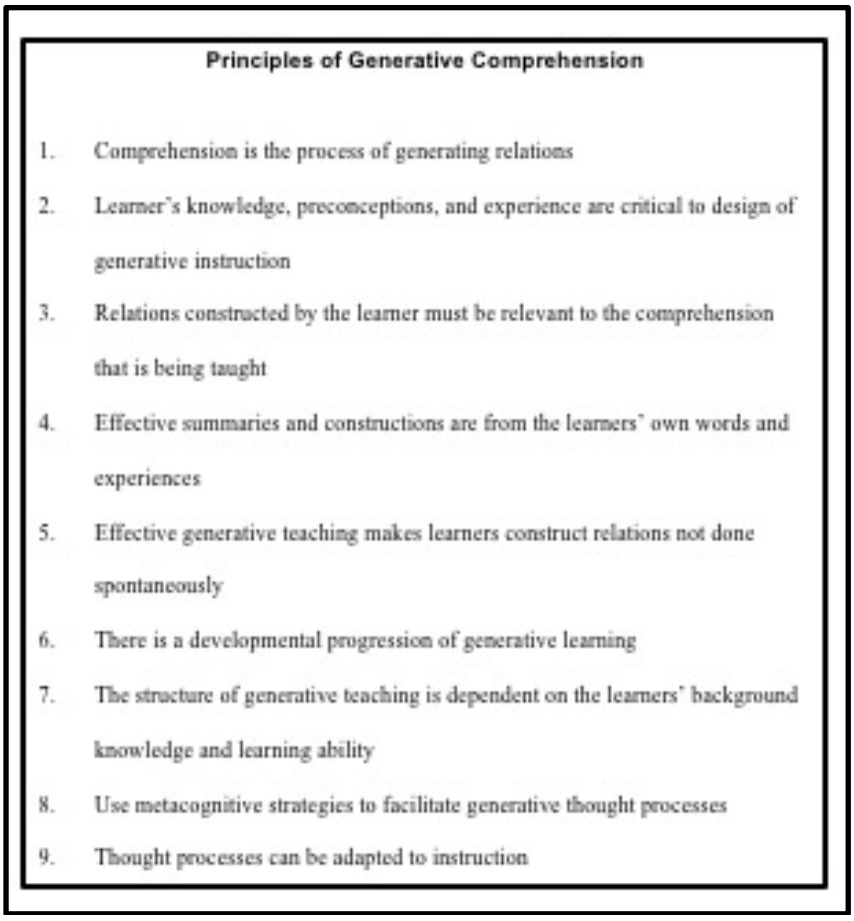

Figure 5. Principles of the Teaching of Generative Comprehension. Merlin Wittrock, "Generative Processes of Comprehension", *Educational Psychologist* 24, no. 4 (1990): 369.

In a 2015 article by Logan Fiorella and Richard Mayer, they provide a detailed analysis of eight generative learning strategies.[62] These strategies were based on empirical studies and suggested how to improve learning. For the scope of this study three strategies are briefly

[61] Merlin Wittrock, "Generative Processes of Comprehension", *Educational Psychologist* 24, no. 4 (1990): 369.

[62] Logan Fiorella and Richard E. Mayer, "Eight Ways to Promote Generative Learning," *Educational Psychology Review* 28, no. 4 (December 2016): 720.

discussed. The first strategy is learning by summarizing.

Summarizing is translating new information into one's own words. It is important that students do not copy presented words or sentences, but they are able to synthesize the information and generate their own interpretation of the information.[63] Studies have found that for summarizing to be an effective strategy students must have the ability and understanding of how to create a quality summary. Additionally, it has been found that summaries are effective for information that is not highly spatial. To generate learning for material such as physics or chemistry, an alternate learning strategy is recommended such as drawing.[64]

Drawing has been shown to be an effective learning strategy for complex material that maybe be difficult to process into words. Studies have shown that providing students with pre-drawn structures allows for them fill in their own ideas and is effective for reducing the extraneous cognitive strain of drawing. The limitations with using drawing as a learning strategy is ensuring students are incorporating all main ideas or concepts into the drawing.[65] This often requires additional guidance. An alternate strategy to learn complex material is self-explaining.

The self-explaining strategy is having students provide an oral summary of the new material or information being provided. This strategy has been shown as highly effective with highly complex material or when given scientific texts.[66] The highlight of this strategy is that it enables students to see consistencies or inconsistencies with new information and their previous mental models. Studies have shown that this strategy is most effective when students ask themselves questions during learning and provide a summarized response.[67]

The analysis of case studies conducted on generative learning theory demonstrates the

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[63] Logan Fiorella and Richard E. Mayer, "Eight Ways to Promote Generative Learning," *Educational Psychology Review* 28, no. 4 (December 2016): 721.

[64] Ibid., 721.

[65] Ibid, 724.

[66] Ibid., 727.

[67] Ibid., 727.

usefulness of this approach. Incorporating the discussed strategies under the principles of comprehension present the utility of the theory and how it can be implemented to improve learning. A commander's visualization should be built on a comprehension of relations which is accomplished through the ability to summarize the information of the operating environment and construct relations. A Commander's Estimate format that allows summaries, models, and drawings enables generative learning. A written summary ensures all the major concepts are included, while a graphic can depict complex concepts that are difficult to summarize in words. Once shared the Commander's Estimate allows for public testing of the commander's process for inductive reasoning which can generate dialogue and further inquiry. The next section of this study examines a theory on how organizations learn, to operationalize the individual learning developed from this theory.

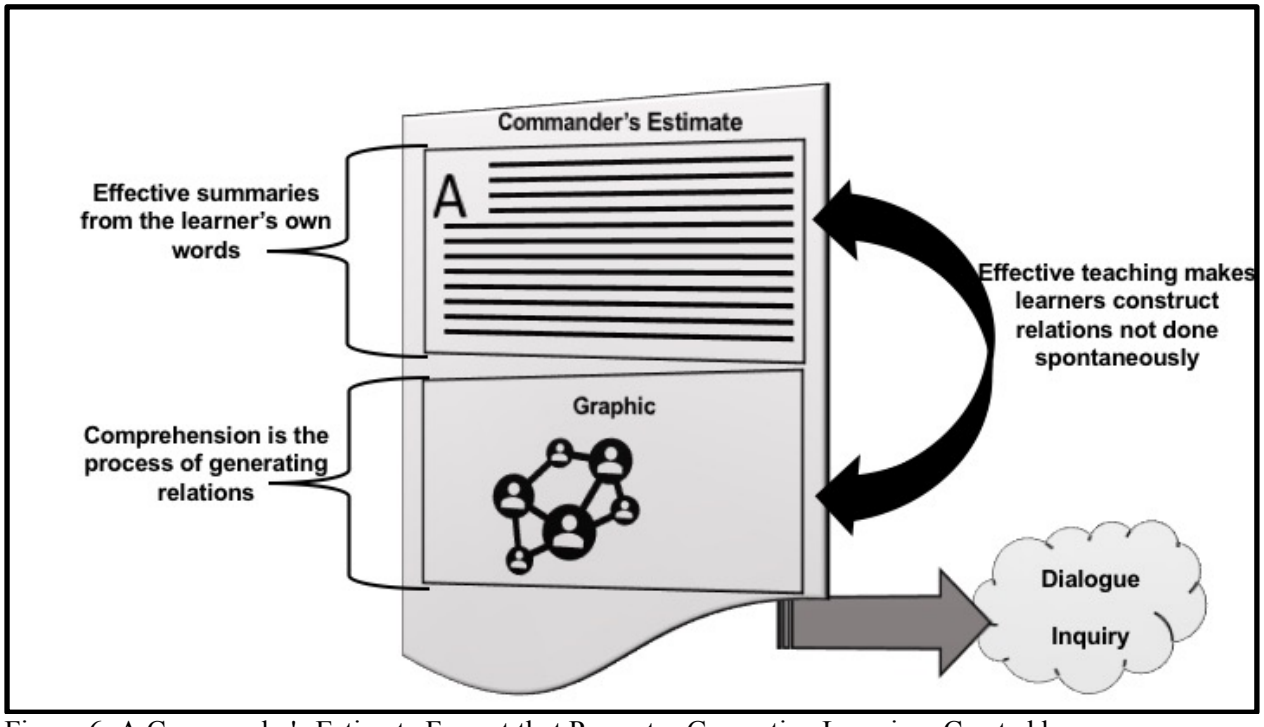

Figure 6. A Commander's Estimate Format that Promotes Generative Learning. Created by Author. Merlin Wittrock, "Generative Processes of Comprehension", Educational Psychologist (1990): 369.

Theory of Action

The previous section of this study examined generative learning theory to gain an understanding of how humans learn. The theory provided strategies to develop a Commander's Estimate format which can help produce a visualization while promoting a culture of inquiry, knowledge sharing, and intellectual flexibility. To further understand the relevance of the Commander's Estimate, it is important to understand how organizations learn, how organizations benefit from individual learning, and what structures or concepts promote learning for an overall organization.

There are many different theories on organizational learning. Theories on organizational learning largely depend on how an organization is defined or from what perspective an organization is viewed from. Some of the common categories from which to examine an organization are: as a group, an agent, a structure, a system, a culture, or as politics.[68] This study specifically reviews the theory of action for organizational learning. This theory takes a normative perspective on an organization to examine how organizations learn. This approach allows for the theory to be used to suggest interventions that improve overall organizational learning.[69] To examine the theory of action this study defines what the theory is, examines the models it produces to describe organizational learning, and then how these models can be used as tools of intervention.

What it is

Chris Argyris and Donald Schoen developed the theory of action perspective on organizational learning. This theory of action published in their 1976 book, *Theory in Practice,*

[68] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978) , 321.

[69] Ibid., 331.

was originally produced to describe interpersonal behavior.[70] The theory of action is what someone ought to do in order to obtain certain results.[71] The authors state that individuals have two theories of action, an espoused theory of action and a theory-in-use. An espoused-theory of action is what someone believes they will do under certain circumstances and the theory-in-use is what they actually do.[72] The authors found that this theory also translated over to organizations and could be used to understand how organizations learn. In order to properly connect interpersonal behavior to the behavior of an organization the authors needed to define how they were viewing an organization. The authors described this by providing three concepts in how organizations act. The first is through cognitive artifacts which are derived from individual images and public maps. Second, an organization acts through a cognitive enterprise accomplished through the individual members of the organization. Lastly, an organization acts through a theory of action-similar to an individual. The definitions for the theories of actions are adapted for organizations. The espoused theory of action is shown through organizational structures, policies, or doctrine. The theory-in-use is the actual behavior of the organization.[73] From this perspective a theory of action views organizational learning through different feedback loops.

A theory of action perspective describes organizational learning by defining three different types of learning loops: single-loop, double-loop, and deutero-loop learning. Single loop learning is when organization responds to changes in their environment by correcting detected errors in order to maintain their current theory-in-use.[74] In double-loop learning organizations

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[70] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978) , iii.

[71] Chris Argyris and Donald Schoen, *Theory in Practice: Increasing Professional Effectiveness* (San Francisco, CA: Jossey-Bass Inc., 1974), 6.

[72] Ibid., 8.

[73] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978), 12-15.

[74] Ibid., 18.

inquire on the source that created the error and then restructure the portions of their theory-in-use which effected the organizations performance.[75] Deutero-loop learning is how organizations learn how to integrate single and double loop learning.[76] With the concepts of learning loops and theories of action, two models were produced to portray how organizations learn. Model O-I models a limited learning organization and Model O-II represents an organization learning in an ideal state.

Model O-I described by a theory of action perspective, models a limited-learning organization. The purpose of the model is to guide diagnosing organizations that are inhibited by their learning and provides a common mapping to use for intervention in improving organizational learning.[77] As shown in figure 4, the Model O-I portrays an organizational system of common learning disabilities which then reveal the direct and indirect effects of feedback loops that are fed with misinformation. There are four governing variables that organizations functioning within this model attempt to achieve: define goals and try to achieve them, maximize winning/minimize losing, minimize negative feelings, and be rational.[78] The design of this model is created from organizations that have a hierarchical design and attempt to simplify problems by breaking them down into smaller or manageable pieces along the organizational structure.[79] While these designs may seem logical when creating an organization they often become inefficient once in operation and the members of the organization do not feel that they cannot alter the structure of the organization. This inhibits learning and presents the system displayed in Model O-I. This model represents what is often seen in organizations the Model O-II represents

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[75] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978), 22.

[76] Ibid., 26.

[77] Ibid., 111.

[78] Chris Argyris and Donald Schoen, *Theory in Practice: Increasing Professional Effectiveness* (San Francisco, CA: Jossey-Bass Inc., 1974), 66-67.

[79] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978), 120.

what organizes strive to be.

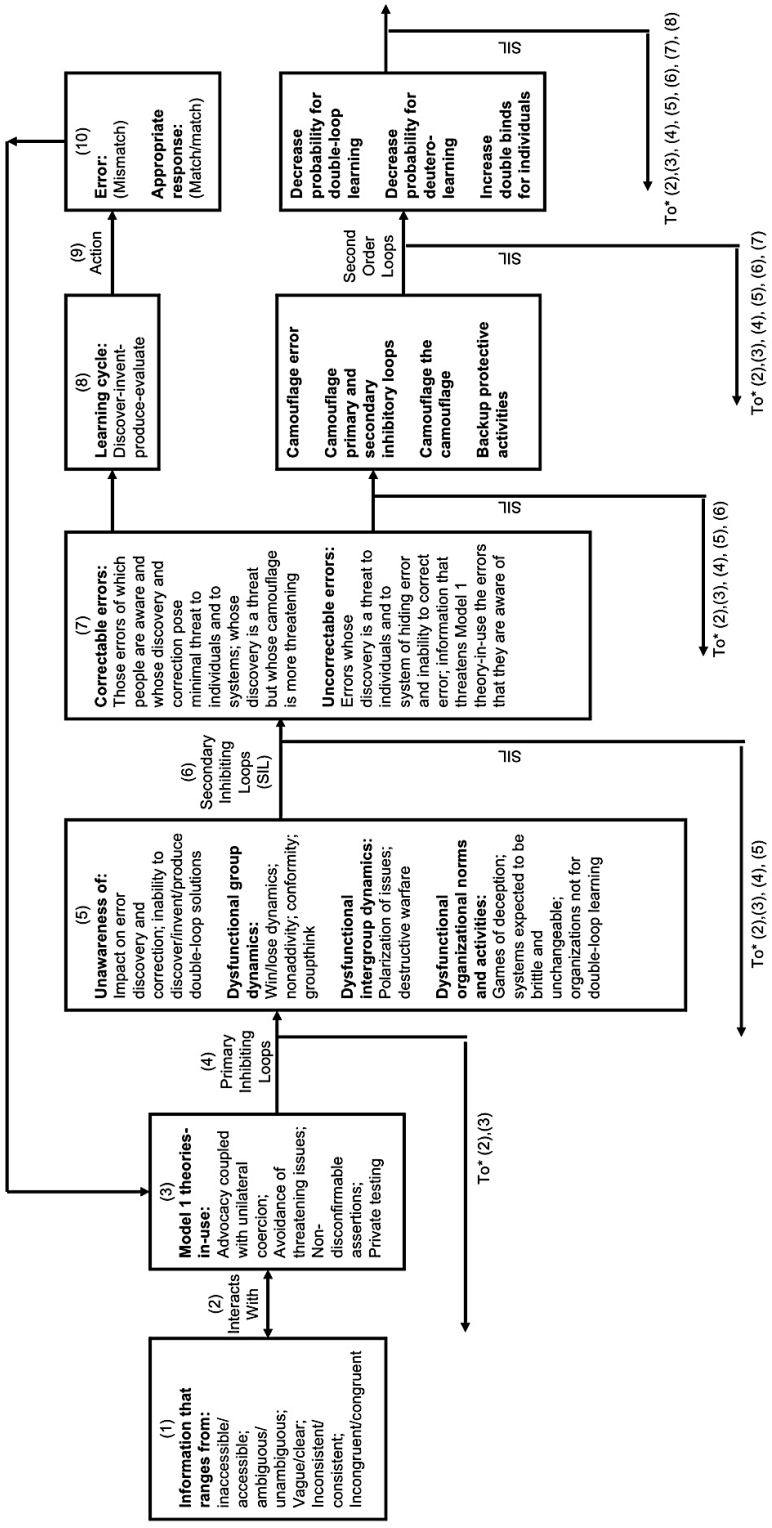

Figure 7. Model O-I: Modified Learning Systems. Modified by Author. Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978),112-113.

Model O-II represents organizations in their ideal states from a theory of action perspective.[80] This model is used to provide organizations with a dialectic; to pair with where they believe they are to where they strive to be. The model as shown in Figure 5 has governing variables which are noticeably polar to those of Model O-I: valid information, informed choice, and internal commitment.[81] In Model O-I members of the organization fear being taken advantage of and are reluctant to be open with information. In Model O-II members readily share information with one another and any personal defensive actions are resisted for the good of the organization. Along with this model Argyris and Schoen propose three concepts for evaluating a good dialectic within an organization: sharing images to provide context for present error, are members opposing one another without releasing the conflict in values (this is bad), and can members advocate their positions while inquiring about others. These models provide organizations the ability to understanding deeply about their learning.

[80] Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978), 131.

[81] Ibid., 137.

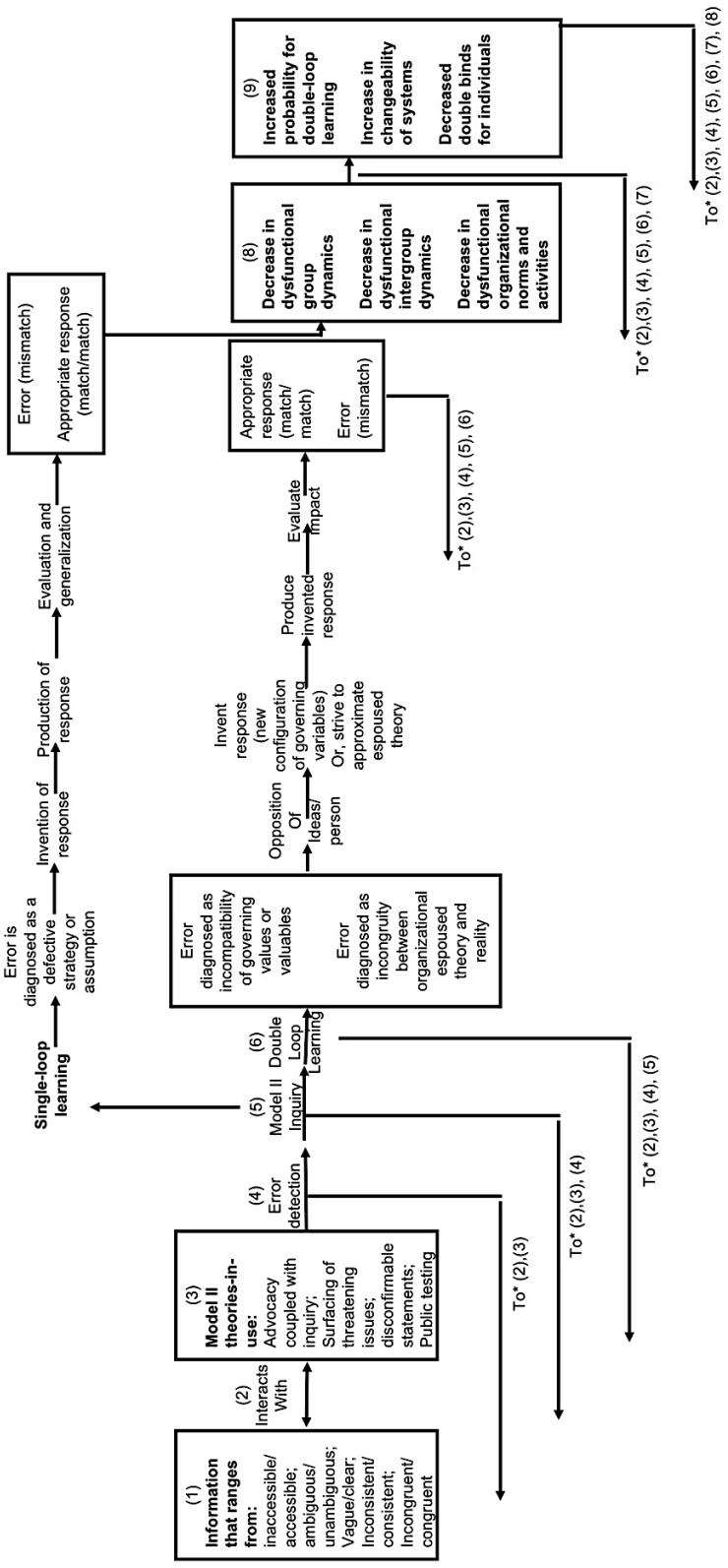

Figure 8. Facilitating Error Detection and Correction. Modified by Author. Chris Argyris and Donald Schoen, *Organizational Learning: A Theory of Action Perspective* (Philippines: Addison-Wesley Publishing Company, 1978), 142-143.

What this means

This theory provides organizations a lens to understand why there is a difference between what they want to be (or believe to be) and what they actually do. This difference can result in errors and eventual failure of the organization. This theory identifies that organizations learn through action. Reflecting on their action is the way that organizations can identify that their espoused theory of action is different from their theory-in-use.

These models provide organizations with an opportunity to analyze themselves against a framework. The common issue is that organizations want to see themselves as mirroring Model O-II when they are much more aligned to Model O-I. This is using defensive reasoning to make their theory resemble Model O-II when the theory-in-use is Model O-I. In order to solve this issue and increase organizational learning, Argyris recommends that organizations focus on changing actual reasoning processes and actions as opposed to changing organizational structures or reward policies.[82]

The reasoning processes and the actions organizations take in decision making are tied to the cultural elements of inquiry, knowledge sharing, and continuous learning. Model O-II displays the need of organizational actions to be based in inquiry and the openness of testing these inquires in public as opposed to creating defensive routines. Being open for dialogue can correct the dysfunctional group dynamics that plague organizations mirroring Model O-I learning. In application to the Military Decision Making Process, this theory suggests the current Commander's Estimate creates dysfunctional group dynamics preventing double-loop learning. As shown previously, the Commander's Estimate in current doctrine is a mental process a commander does in private to develop a visualization for the operation. By producing a Commander's Estimate for public testing in an environment focused on inquiry, the MDMP can create a double loop learning process.

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[82] Chris Argyris. *Organizational Traps: Leadership, Culture, Organizational Design* (New York, NY: University of Oxford Press, 2010), 194.

Analysis

This study conducted reviews on history, doctrine, and theory. Examining history reinforced the facts that the Prussian general staff and system was created to overmatch the military genius of Napoleon and reviewed the origins of the US Army planning process. The review of US Army doctrine has shown the evolution from deductive analysis to a process of inductive and deductive analysis. Connecting understanding of the theories studied to the history and current application of US Army doctrine provides analysis to the relevance of the Commander's Estimate in developing organizational culture. By creating a format and incorporating it into the MDMP the Commander's Estimate can increase the cultural elements of inquiry and innovation, intellectual flexibility, knowledge sharing, and continuous learning. This is evident in how a Commander's Estimate format can generate learning, promote the public testing of ideas, and allow for continuous feedback.

A Commander's Estimate can allow for generative learning. Generative learning theory shows that summarizing new information into one's own words enable learning. By creating a Commander's estimate that provides a summary of information, commanders can learn and begin to connect relations. Understanding relationships of new information generates learning and inductive analysis which lead commanders to want to inquire for more information. This is similar to Napoleon's decision making cycle in 1806. His cycle focused on synthesizing information and inquiring subordinates for more information through reports and battlefield circulation. The current US doctrine does not have a specific format for the Commander's Estimate. It currently uses the same format as a staff running estimate, which is a format for deductive analysis. Developing a format that uses summaries, models, and graphics enables generative learning and guides a commander through inductive reasoning. With a format of this type a commander can take a leading role in incorporating the cultural imperative of inquiry into his organization during the planning process. A commander that is actively seeking information

and learning will have a positive effective on the rest of the organization. By using this format as an input into the MDMP the Commander's Estimate also creates a culture of knowledge sharing.

Producing the Commander's Estimate in the MDMP promotes the culture of inquiry and knowledge sharing. This is evident in comparing the MDMP to the Model O-II for organizational learning. By producing the Commander's Estimate the commander's visualization of the battlefield becomes public. This allows for public testing and the surfacing of disconfirmable statements, which are the possible cognitive bias the commander used to develop his visualization. These are both elements of the Model O-II theory-in-use and generate an environment of knowledge sharing. Producing the Commander's Estimate also promotes inquiry as the staff and subordinates can then question and dialogue the process the commander used to develop his visualization, allowing for error detection to refine the visualization. This is similar to the outcomes of the Prussian military reformation. Their educational focus on inquiry of mental models and decision making generated increased knowledge sharing with the General Staff and Commander, creating a visualization of the battlefield through a cyclic process of inductive and deductive analysis. This visualization was operationalized by being placed into organizational system that focused on continuous learning, allowing the visualization to continue to adapt as the battlefield changed with a rapid tempo.

The Commander's Estimate provides the opportunity for continuous learning. This is shown through the theory of action perspective. Producing a Commander's Estimate in the MDMP allows the organization to operate of the elements of the Model O-II theory-in-use which allows organizations to detect errors in the commander's visualization. By providing the Commander's Estimate to subordinates they can diagnose errors in the visualization as they act from its guidance. This causes the subordinates to invent a new response and then evaluate the impact, generating double loop learning and continuous learning. This continuous learning is imperative for a successful Mission Command approach. Subordinates need to operate off the Commander's Intent, but also be able to understand when the battlefield has changed enough to

generate a reframing of the commander's visualization. In this occurrence, subordinates must invent a new response to understand the changing battlefield, and then inform the commander. This action is using disciplined initiative to aid in continuous learning of the organization and can only occur in environment of mutual trust and shared understanding. This type of environment can be established through the use of the Commander's Estimate.

The Commander's Estimate is relevant for changing the culture in US Army tactical organizations. Modifying the format of the estimate and incorporating it into the MDMP presents the opportunity for implementing the cultural elements of inquiry and innovation, knowledge sharing, intellectual flexibility, and continuous learning. This study also suggests that the Commander's Estimate is a vital element for the execution of Mission Command as it enables an environment of mutual trust and shared understanding while allowing disciplined initiative to aid in organizational learning. In increasingly complex and rapidly changing environments the Commander's Estimate is especially important. It provides the ability of subordinates to inform the commander when the battlefield no longer resembles his visualization, which can mean that his commander's intent is no longer valid. This analysis has shown there is a need for modifying the Commander's Estimate format and how it can be incorporated into the MDMP. The next section of this study provides these conclusions along with recommendations for further study.

Conclusion

This study has displayed the relevance of the Commander's Estimate. Analysis has shown a need for a modification of the format and the need for its incorporation into the MDMP. Further study is necessary to implement these changes and the possible larger organizational impacts from the conclusions. This study concludes with providing recommendations of a Commander's Estimate format, changes to US Army planning doctrine, and for future study.

The purpose of modifying the Commander's Estimate format is to enable generative learning for the commander while enabling a process to develop his visualization of the battlefield. According to the current doctrine, the commander's visualization includes understanding the current situation, the desired endstate, and an operational approach as shown in figure 4. A Commander's Estimate can provide information on those three elements while enabling generative learning and aiding the commander for future inputs in the MDMP. The current situation is understood by synthesizing the current operational environment, which will help the commander develop his problem statement. To develop the problem statement, the commander must also understand his desired endstate, which requires an internal reflection of acknowledging what the organization needs to achieve and in what conditions. This reflection leads to developing a commander's intent. Lastly, the operational approach (OA) is generated by understanding and establishing the relationship between the current state and the desired state. Incorporating the OA into the Commander's Estimate provides the commander the opportunity to frame his planning guidance for the staff later in the MDMP. Through this format, the staff and subordinate organizations can understand the visualization and mental process used to develop the problem state, commander's intent, and planning guidance for an operation. This recommended format is shown conceptually in Figure 9. Noticeably, the format is similar to a current US Army doctrinal construct.

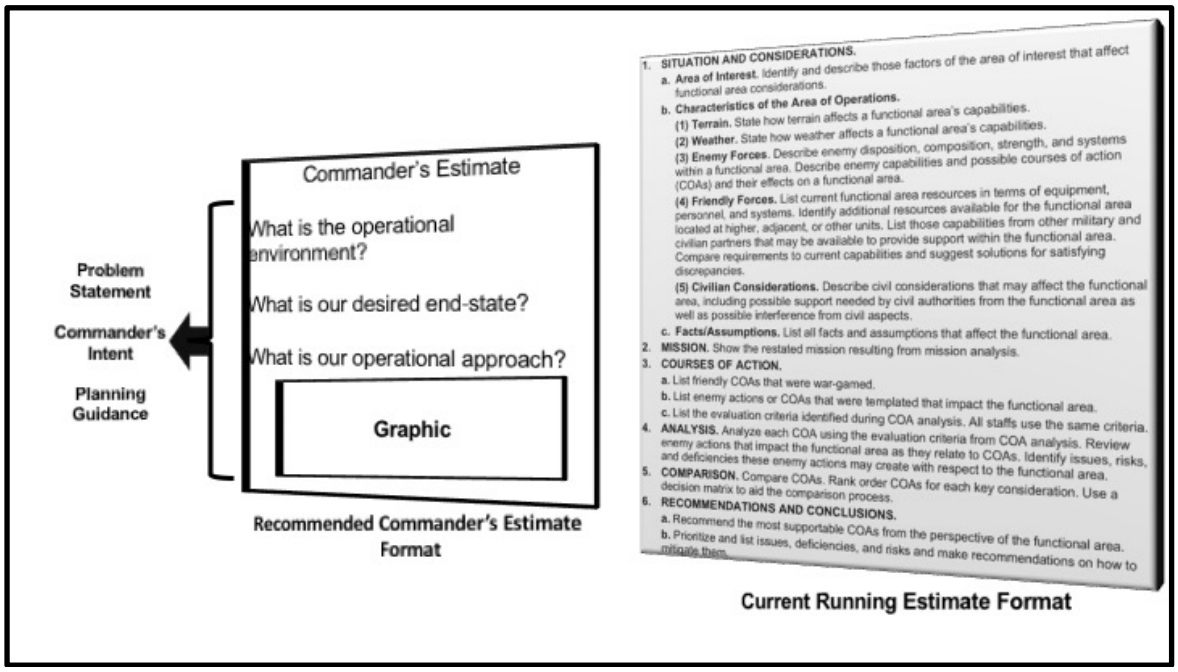

Figure 9. Recommended Commander's Estimate Format. Created by Author. US Department of the Army, Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Government Printing Office, 2014), 8-2.

The recommended Commander's Estimate format is similar to the activities of framing the operational environment, framing problems, and framing solutions that are conducted during Army Design Methodology (ADM).[84] ADM aids organizations in the conceptual aspects of planning and must be combined with the MDMP to produce executable plans. There is currently not a prescribed method for employing ADM during the MDMP, and it is not always used during planning. Conclusions from this study show the Commander's Estimate should resemble the products that are produced during ADM and incorporated into the MDMP in a similar manner. As currently mentioned in doctrine, when the problem is ill-structured, difficult to identify, or the endstate is unclear then a commander can develop a team and use ADM to help him produce the Commander's Estimate.[85] This is a decision made by the commander when he understands he can longer provide a worthwhile product to his organization without the input of others in support.

[84] US Department of the Army, Army Training Publication (ATP) 5-0.1, *Army Design Methodology* (Washington, DC: Government Printing Office, 2015), 1-3.

[85] US Department of the Army, Army Doctrine Publication (ADP) 5-0, *Operations Process* (Washington, DC: Government Printing Office, 2019), 2-17.

With the Commander's Estimate being similar to the current ADM doctrine it is recommended that it is inputted in the MDMP in comparable locations.

Currently, ADM products are used during the Mission Analysis step of the MDMP, with reframing done throughout the process as necessary.[86] At the conclusion of the planning process, ADM products are placed in Appendix 1 of Annex C in the Operations Order.[87] This study concludes that the Commander's Estimate should be input into the process in the same way. Additionally, the estimate should be a part of Warning Order 2, which is produced and distributed after the Mission Analysis step.[88] By placing the Commander's Estimate in this document, subordinates are able to receive the commander's visualization after being refined by the staff. This enables subordinates to provide feedback and refinement to the visualization, which can aid the planning effort. The Commander's Estimate should be continually referenced throughout the MDMP and distributed as it is refined with further planning and new information is produced. This allows the commander to drive the planning process and embody the cultural imperatives of the Army People Strategy. Developing a Commander's Estimate in the recommended format requires specific talent which may differ than what most US Army commanders are trained to have.

A recommendation for future study targets the Develop Talent line of effort in the Army People Strategy. Studying the necessary leader talents that can promote the new cultural imperatives and the talents necessary to develop a battlefield visualization in the current and future operating environment would be vital in implementing this approach. A suggestion from readings conducted to during this study is to examine the concept of sensemaking as relevant talent for Army leaders. Sensemaking is the activity of articulating a complex environment into

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[86] US Department of the Army, Field Manual (FM) 6-0, *Commander and Staff Organization and Operations*, (Washington, DC: Government Printing Office, 2014), 9-3.

[87] Ibid., D-20.

[88] Ibid., 9-3.

words and resulting in further action.[89] Sensemaking is one of the four leadership capabilities used in MIT's "4-CAP model of leadership.[90] It is recommended that this concept be studied to determine how training sensemaking in leaders can result in a better visualization of the battlefield. Additionally, if sensemaking is determined to be a worthy capability of the military leader, then how can this capability be utilized further during the operations process? Hypothesis from this study finds that sensemaking is a critical capability needed in US Army leaders at all levels. In relation specifically to this case study, sensemaking is a critical talent necessary to the production the Commander's Estimate and that the Commander's Estimate may not be in current doctrine because US Army leaders are not sufficiently trained in sensemaking.

In conclusion, the Commander's Estimate has historically been the central product of the US Army planning process, just as the commander is the central person driving the process regardless of decentralized execution. In order to develop the cultural imperatives outlined by the Army People Strategy, tactical organizations must create a planning process that is conducive to that environment. This study has shown that the Commander's Estimate can be a catalyst for organizations to develop their culture and it is imperative for successful execution of Mission Command. This makes the Commander's Estimate a relevant and necessary product for the Military Decision Making Process.

In closing, this study has concluded the relevance of the Commander's Estimate in developing the culture in US Army tactical organizations. Throughout history, the Commander's Estimate has been integral to the planning of military operations and that cannot change; regardless of decentralized execution. Analysis and recommendations have been made to further study suggested modifications of the Military Decision Making Process to enable mutual trust and shared understanding. MDMP does not need to go away, instead leaders must view the

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[89] Deborah Ancona, "Sensemaking: Framing and Acting in the Unknown," in *The Handbook for Teaching Leadership: Knowing, Doing, Being*, ed. Scott Snook, Nitin Nohira, and Rakesh Khurana (Thousand Oaks, California: Sage Publications, 2012), 4.

[90] Ibid., 4.

process from a new paradigm. The process is for detailed planning to produce an order, but the learning that occurs during the process and the environment that it facilitates creates the shared understanding of the situation and mission. This enables the execution of mission command.

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