Wargaming, the Laboratory of Military Planning

A Wargaming Collaboration between U.S. and Brazilian Army Command and General Staff Colleges

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Wargames are analytical games that stimulate aspects of warfare at the tactical, operational, and strategic level. They are used to examine warfighting concepts, train and educate commanders and analysts, explore scenarios, and assess how force planning and posture choices affect campaign outcomes.
—RAND Corporation

Due to the rate and magnitude of change and an anticipated future ambiguous and chaotic world, effective organizations must have wargaming skills to determine the quality of their plans, discover exceptional information, and anticipate what will cause their plans to fail or succeed. Researchers on this project noticed similarities between the skills needed to effectively wargame plans and the skills required of scientists engaged in experimentation.

It is possible that military planning processes were modeled off the scientific method. (Refer to the brief literature review at the end of this article for sources that help support this claim.) Some might claim that military planning not only resembled scientific thinking but was also created in its image.[1] There are many similarities between the scientific method and military planning processes. They both involve observation and analysis, hypothesis formulation, experimentation/ testing, feedback/adjustment, decision-making, and execution/evaluation. If military planning processes are modeled after the scientific method, then planners would be well advised to behave more like scientists during planning. Such an attitude would encourage adaptation when evaluating the quality of their plans. For example, although military planners are aware that their plans are not perfect, they may not be aware
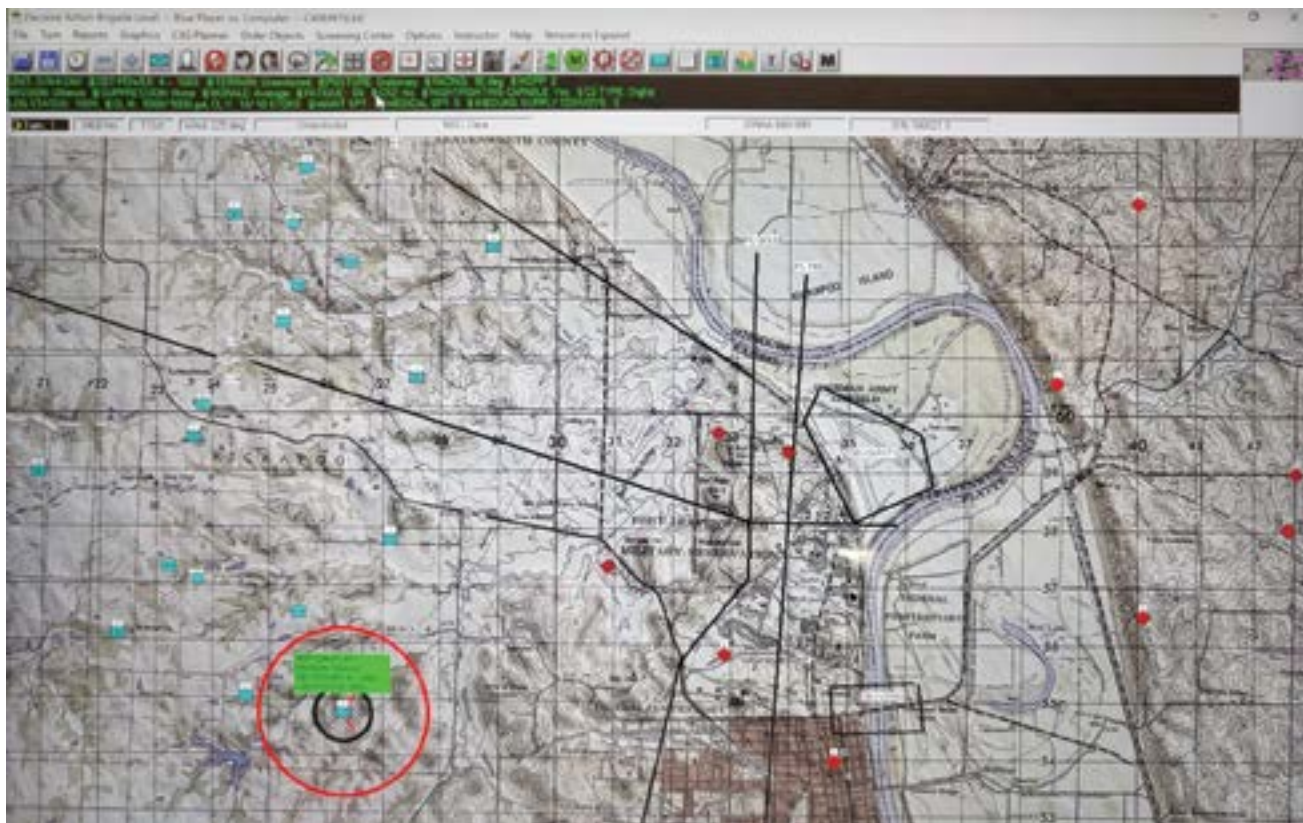
The first phase of a wargaming exercise conducted by U.S. Army and Brazilian army student officers in May–June 2023 was based on commercial simulation software Decisive Action. (Photo by Richard A. McConnell)

of how imperfect they really are. Scientists adopt a pragmatic view of their experiments, trying to disprove their hypotheses. In contrast, military planners often present plans as an 80-percent solution, try to prove their hypothesis, and are, therefore, reluctant to change the plan. For example, from pharmaceutical studies, scientists realize that the probability of success goes up through iterations of the scientific method over time, so initial clinical trials are usually more wrong than they are right. Military planners could benefit from a more scientific attitude toward the plans they create, tuning themselves to recognize the emergence of exceptional information. When applying the metaphor of the scientific method to military planning, the wargame becomes the laboratory. In the wargame laboratory, like the scientific method, assumptions are tested, experiments with plans are conducted, and lessons are learned and applied iteratively to improving plans.

A collaboration between the U.S. and Brazil armies used a scientific approach to examine wargaming options applied to land military scenarios and to solve complex problems given uncertainty and ambiguity. This experiment started with a computer simulation, which then adapted analog means, like the wargaming study conducted at the U.S. Army Command and General Staff College (CGSC), to investigate effective ways to visualize.[2] Thus, the collaboration was a practice in the scientific method by building on previous scholarship that discovered analog simulations could effectively improve visualization.

This article is the culmination of this U.S. and Brazilian partnership. It captures descriptions of military-planning thinking patterns that effectively employ wargaming, visualization, and exceptional information identification. Researchers explored a scientific method-like approach to military planning, drawing parallels between the two. The wargaming laboratory can aid military planners to scientifically examine the viability of their plans before real-world testing. Recommendations will be proposed for potential wargaming options to improve planning and the scientific-like thinking that supports it.

Based on the phase one computer products from the decisive Action simulation software, the students continued the wargaming exercise using the map-based Land Power analog simulation. (Photo by Richard A. McConnell)

A brief literature review at the end of this article includes a discussion of the history of the scientific method and its connection to military planning. These sources specifically discuss the scientific thinking at the foundation of military planning. The U.S. military has a history of wargaming that is uneven, which is cited in the wargaming study. At times, wargaming during the military decision-making process is either skipped or given short shrift. Therefore, improvement of wargaming is a focus in many of the combat training center reports on lessons learned. The Brazilian army has a similar history with wargaming, and its leaders are interested in improving wargaming for their army. This collaboration is an attempt to address the need for improved wargaming for the U.S. and Brazilian armies through improved educational approaches.

Key Concepts in Effective Wargaming

Before moving on, readers should become familiar with several concepts associated with wargaming: exceptional information, visualization, corporate visualization, and wargaming.

- **Exceptional information.** Unexpected threats and opportunities that appear while trying to solve problems.[3]
- **Visualization.** The imaginative and creative skill to interpret observed clues in the environment, anticipate the emergence of exceptional information, and act first.[4]

- **Corporate visualization.** Visualization shared across an organization that enables adaptive resilience to inflict exceptional information upon opponents.[5]
- **Wargaming.** A thought experiment employing analog or digital means to strengthen visualization, tune players to recognize exceptional information, and predict how plans could fail or succeed.[6] This mixed methods study in wargaming set the foundation for many studies that followed.[7]

What follows is a description of using wargaming as a laboratory between the U.S. Command and General Staff College (CGSC) and the Brazilian army's *Escola de Commando e Estado-Maior do Excercito* (ECEME, Brazil's equivalent of CGSC).

Discussion of Analog Simulations

Although computer simulations are often very good and useful, they are also expensive and require specialized training. Analog simulations tend to be cost effective, simple, easy to learn, and tailorable to the needs of learning audiences. This section focuses on building cost-effective, simple analog simulations that could be used to effectively improve visualization. Some of the process that the U.S. Army CGSC and the Brazilian army ECEME students went through in the May-June 2023 exchange can be seen in the photos throughout the article. Students started with a computer simulation, then developed an analog simulation based upon the computer simulation, and finally invented a new

When phase two was complete, the students were forced to continue phase three without maps and instead devised another analog method to complete the wargaming exercise using white boards. (Photo by Richard A. McConnell)

analog simulation based on what they had just done. This process was a scientific approach to reframing the simulation into its simplest form to find any changes in effectiveness. Three simulations were used in one day, and two of them were invented by the students.

Current U.S. Army doctrine keeps the possibility of using different forms of wargaming. These forms range from simple manual methods to highly sophisticated computer-aided simulations.[8] Sometimes, less costly and uncomplicated methods can provide military planners with the adequate opportunity to examine their plans' suitability, feasibility, and acceptability through a more scientific lens. The experience from CGSC and ECEME students during the last exchange program between the two organizations is an excellent example of the use and benefits of simple wargames as laboratories for military planners.

In May 2023, during a visit of American military officers to ECEME, CGSC faculty members organized and conducted an exercise to improve the visualization abilities and the quality of plans among the students at both schools. Initially, the activity was based on computer platforms using the commercial simulation software Decisive Action. The exercise simulated a brigade-level operation where one brigade, assigned to a division, was executing an offensive operation to seize key terrain as a supporting effort. The other brigade was defending against this attack to prevent the enemy from controlling this advantageous position. The interaction through the Decisive Action software lasted for a few hours. After this period, the exercise direction changed the focus from a computer-based approach to a map-based one. This transition started the second phase of the exercise.

During the second phase, the faculty organized the students into three groups; the first two represented the two opposing brigades while the third was responsible for running the exercise (white cell). In this phase, the students used the Land Power analog simulation. It included maps, counters, and a set of rules. After a short period of adaptation, the students resumed the wargame in a proficient way. The action, reaction, and counteraction cycles occurred under the guidance and supervision of the white cell and were very insightful, generating a series of improvements in the plan. Then, the faculty changed the direction of the exercise by

taking away the maps from the students and asking them to find an alternative way to continue to perform the course of action analysis. Surprisingly, the American and Brazilian students quickly figured out a solution to the problem. Using some available whiteboards, they reorganized the room and, in a very short time, resumed the wargame.

In this less conventional approach, the wargame dynamic remained essentially the same, with the parties playing their roles under the supervision of the white cell. Each staff turned the board away from the other's view and sketched the terrain to conduct their planning and assessment. The white cell board kept its map where the confrontation was assessed. The rules of Land Power were the baseline for the wargame execution, and the turns followed their normal sequence: action, reaction, and counteraction. The white cell calculated the friction using a dice chart after each turn was over.

The most interesting aspect of this approach was that the exercise directors and the students could not see any significant degradation in the quality of the insights produced during the process. What they observed was the opposite; using whiteboards rather than maps and computers improved their ability to understand, visualize, and describe the operational environment and the mission. By being forced to depict the area of operation and the friendly and enemy forces on the whiteboard using manually written board work, and to run the wargame using these means, the students achieved a satisfactory and, in some cases, superior level of situational understanding. Rather than using products created for them, students had to adjust to making their own maps and products, switching from a horizontal playing field to a vertical whiteboard—a form of reframing. This was not only a shift of physical perspective, but it was also a shift of moving already created tokens to their work. This observation runs

parallel to findings recently published in showing how manual note-taking improves memory and learning—skills needed for effective wargaming.[9]

This experience was highly beneficial to the students, and it provided a way to test the plan developed during classes with minimal preparation and almost no cost. This approach toward wargaming can be helpful to armies and organizations in periods of budget constraints or scarce resources. Only small adjustments are necessary for a broader implementation within the Brazilian army. It includes the development of an analog algorithm and the related charts following the Brazilian army's estimated planning data. This adaptation of Land Power to the Brazilian army can improve the learning process, particularly at ECEME, where officers hone their abilities as planners. Further, such an approach to wargaming and simulations could be applied beyond combat operations to humanitarian aid and support as well as displaced person/refugee operations. The creativity and flexibility that analog simulations facilitate have the potential to vastly improve planning and preparation for both the U.S. and Brazilian CGSCs.

Conclusion

The U.S. and Brazilian armies must operate in a world becoming increasingly chaotic and filled with ambiguity. The rate of change is accelerating, and the magnitude of change is increasing. The need for wargaming has never been more acute. Wargaming is the laboratory where military planners discover what will make the plan fail and what they must do to ensure that the plan succeeds. Taking a scientist's sensibility toward planning would encourage leaders to execute more due diligence in creating plans that can succeed in the real world. We encourage leaders to use analog simulations to improve the rigor andquality of plans their units produce. ■

Notes

Epigraph. "Wargaming," RAND Corporation, accessed 1 March 2024, https://www.rand.org/topics/wargaming.html.

1. Glenn Voelz, "Is Military Science 'Scientific'?," *Joint Force Quarterly* 75 (4th Quarter, October 2014): 84–90, https://nd-upress.ndu.edu/JFQ/Joint-Force-Quarterly-75/Article/577566/is-military-science-scientific/.

2. Richard McConnell et al., "The Effect of Simple Role Playing Games on the Wargaming Step of the Military Decision Making Process (MDMP): A Mixed Methods Approach," *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL [Annual Conference of the Association for Business Simulation and Experiential Learning] Conference* 45 (2018), https://absel-ojs-ttu.tdl.org/absel/article/view/3200; Richard McConnell and Mark Gerges, "Seeing the Elephant: Improving

Leader Visualization through Simple Wargames," *Military Review* 99, no. 4 (July-August 2019): 107–15, https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/July-August-2019/McConnell-War-Games/; Richard McConnell, Jacob Mong, and Dawn Patashek, "Seeing through the Fog: Developing Fog of War Resistant Visualization," *Military Review* 101, no. 1 (January-February 2021): 58–67, https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/January-February-2021/McConnell-Fog-of-War/.

3. Jason R. Wolfe, "Exceptional Information: Recognizing Threats and Exploiting Opportunities" (master's thesis, U.S. Army Command and General Staff College, 2017), https://apps.dtic.mil/sti/tr/pdf/AD1039564.pdf.

4. Richard McConnell, "Connecting the Dots: Developing Leaders Who Can Turn Threats into Opportunities," *Military Review* 100, no. 3 (May-June 2020): 27–35, https://www.armyupress.army.mil/Journals/Military-Review/English-Edition-Archives/May-June-2020/McConnell-Connecting-the-Dots/.

5. McConnell, Mong, and Patashek, "Seeing through the Fog."

6. Ibid.; McConnell et al., "The Effect of Simple Role Playing Games"; McConnell and Gerges, "Seeing the Elephant."

7. Richard McConnell et al., "The Ethics Game: A Mixed Methods Examination of Learning Outcomes Using Games," *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL Conference* 47 (2020): 281–333, https://absel-ojs-ttu.tdl.org/absel/article/view/3288; Richard McConnell and Angus Fletcher, "Creativity: The 'Backbone' of Initiative," The NCO Journal, 17 April 2023, https://www.armyupress.army.mil/Journals/NCO-Journal/Archives/2023/April/Creativity/; Richard McConnell et al., "Improving Creative Thinking through Narrative Practice," *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL Conference* 50 (2023): 341–95, https://absel-ojs-ttu.tdl.org/absel/article/view/3383.

8. Field Manual 5-0, *Planning and Orders Production* (Washington, DC: U.S. Government Publishing Office [GPO], May 2022), 5-36–5-38; Army Techniques Publication 5-0.2-1, *Staff Reference Guide Volume I: Unclassified Resources* (Washington, DC: U.S. GPO, December 2020), 55.

9. Charlotte Hu, "Why Writing by Hand Is Better for Memory and Learning: Engaging the Fine Motor System to Produce Letters by Hand Has Positive Effects on Learning and Memory," *Scientific American* (website), 21 February 2024, https://www.scientificamerican.com/article/why-writing-by-hand-is-better-for-memory-and-learning/.

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Maj. Thiago Caron da Silva is a Brazilian army officer concluding the Command and General Staff equivalent course in Rio de Janeiro. He has experience with armored and intelligence units. Caron was a Brazilian Army Captains Career Course instructor and a law professor in the Brazilian Army Military Academy, where his primary study area was international humanitarian law.

Brief Literature Review

Christopher Paparone discusses the history and evolution of military planning in his article titled "US Army Decisionmaking: Past, Present, and Future." He also highlights "emergent factors," which resemble exceptional information-unexpected threats and opportunities that arise during execution. This article provides insights into the influence of scientific thinking on military planning and visualization throughout history. See Christopher R. Paparone, "US Army Decisionmaking: Past, Present, and Future," *Military Review* 81, no. 4 (July-August 2001): 45–53, https://cgsc.contentdm.oclc.org/digital/collection/p124201coll1/id/225/rec/2.

Jason Wolfe explores exceptional information in his master's thesis. He emphasizes that a thinker's attitude affects their ability to visualize. Preparedness for the unexpected enhances recognition and timely action by military planners and scientists. See Jason R. Wolfe, "Exceptional Information: Recognizing Threats and Exploiting Opportunities" (master's thesis, U.S. Army Command and General Staff College, 2017), https://apps.dtic.mil/sti/tr/pdf/AD1039564.pdf.

Robert P. Pellegrini asserts that military theory evolved using scientific language. His thesis, "The Links Between Science, Philosophy, and Military Theory: Understanding the Past, Implications for the Future," demonstrates how scientific metaphors aid military theorists in navigating battlefield complexities and improving visualization skills. See Robert P. Pellegrini, "The Links between Science Philosophy, and Military Theory: Understanding the Past, Implications for the Future" (master's thesis, Air University, 1997), https://apps.dtic.mil/sti/tr/pdf/ADA329077.pdf.

Glenn Voelz traces the evolution of military thought from Issac Newton to Baron de Jomini, Carl von Clausewitz, J. F. C. Fuller, and Frederick Hayek in his article "Is Military Science 'Scientific'?" This source establishes evidence that military planning not only resembled scientific thinking but was also created in its image. See Glenn Voelz, "Is Military Science 'Scientific'?," *Joint Force Quarterly* 75 (4th Quarter, October 2014): 84–90, https://ndupress.ndu.edu/JFQ/Joint-Force-Quarterly-75/Article/577566/is-military-science-scientific/.

William Thomas, in his article "The Heuristics of War: Scientific Method and the Founders of Operations Research," discusses incorporating scientists into military planning during World War II through operations research. This unique outsider's perspective offers insights into visualization and exceptional information. See William Thomas, "The Heuristics of War: Scientific Method and the Founders of Operational Research," *British Society for the History of Science* 40, no. 2 (June 2007): 251–74, https://doi.org/10.1017/S0007087407009508.

Thomas S. Fischer, in his doctoral dissertation, clarifies the relationship between design thinking and the military decision-making process. By applying the scientific method to specific planning processes like design, this source prepares planners for visualizing emerging exceptional information. See Thomas S. Fisher, "Clarifying the Relationship of Design Thinking to the Military Decision-Making Process" (PhD diss., University of South Florida, 2020), https://digitalcommons.usf.edu/etd/8537/.

Richard McConnell et al., in their mixed methods research report, explore the impact of simple role-playing games on the wargaming step of the military decision-making process. This study highlights wargaming as a laboratory for military planners, akin to how laboratories benefit scientists' visualization and recognition of exceptional information. See Richard McConnell et al., "The Effect of Simple Role Playing Games on the Wargaming Step of the Military Decision Making Process (MDMP): A Mixed Methods Approach," *Developments in Business Simulation and Experiential Learning: Proceedings of the Annual ABSEL [Annual Conference of the Association for Business Simulation and Experiential Learning] Conference* 45 (2018), https://absel-ojs-ttu.tdl.org/absel/article/view/3200.