

Wargaming in Professional Military Education Challenges and Solutions

Colonel Eric M. Walters, USMC (Ret)

Abstract: Given the emphasis to employ wargaming in professional military education, how can instructors in the schoolhouses, operating forces, and supporting establishment—particularly those who are not experienced wargamers themselves—go about it? This article explains the necessity of crafting desired learning outcomes to selected, modified, or in-house designed serious wargames with the assistance of accomplished experts. Summarizing relevant recent scholarship, it provides foundational terminology and concepts that facilitate collaborative conversations, as well as offers advice regarding common but avoidable pitfalls of this dynamic and immersive teaching method.

Keywords: professional military education, PME, serious games, serious wargames, educational games, role-playing games, matrix games, solitaire wargames

Commercial wargaming was—and arguably still is—a niche hobby for those who look at wargaming as more than merely an entertaining diversion; during its history in the twentieth and early twenty-first centuries, only a relatively small proportion of military members and academics regularly played what have been termed as serious wargames.¹ In the past, there was insti-

Eric M. Walters teaches strategy, operational art and design, Joint operations planning, and execution of unified action for the U.S. Army Command and General Staff Officers' Course, Fort Lee Satellite Campus. He served as a tank officer and Marine Air-Ground Task Force intelligence officer at the tactical, Joint, and combined operational and strategic levels. An active hobby wargamer for more than 40 years, he has assisted commercial companies to develop a dozen published manual and computer wargame titles and is currently active in several online hobby wargame communities. He also integrated a variety of decision games into his curriculum for Marine Corps, Army, and American Military University courses and advised the Department of Defense on integrating serious games into intelligence training and education.

Journal of Advanced Military Studies vol. 12, no. 2

Fall 2021

www.usmcu.edu/mcupress

<https://doi.org/10.21140/mcu.j.20211202003>

tutional resistance to the idea of using what some felt to be children's games in professional military education (PME); while that stigma has lessened recently, the learning barriers for wargames nevertheless remain high for the uninitiated.² The games can be hard to learn and even more difficult to win against a competent opponent.³ Yet, here we are in 2021; military wargaming appears to be undergoing a resurrection in PME schools, the operating forces, and even the supporting establishment. Commandant of the Marine Corps General David H. Berger in his *Commandant's Planning Guidance* emphasizes the need for practicing military decision making in PME, which is the primary purpose of educational wargaming.⁴ But one fact remains; for those who are interested in using and designing wargames to teach military judgment, this teaching method can seem too difficult to implement effectively.⁵ The success stories in academia involve professors, instructors, and Marine leaders in the operating forces who already are wargamers.⁶ How does someone who is not a wargamer but teaches military decision making figure out what wargame to use? How does one use it? What are the advantages and limitations of the various games available? What are the challenges in integrating wargames and curriculum, and how can these be overcome? This article intends to help orient those unfamiliar with wargaming and advise on proven best practices in using them when teaching military judgment in decision making.

Overcoming Past Legacies

Even in its modern beginnings in Prussia, wargaming—as it emerged from abstract predecessors into more realistic depictions of combat—was not always a very popular teaching method within the military education establishment.⁷ While the Prussian chief of staff, General Karl von Müffling, had initially been against the idea, he was subsequently won over after witnessing an 1824 kriegspiel demonstration by Lieutenant Georg von Reisswitz. “It’s not a game at all, it’s training for war. I shall recommend it to the whole army,” the grizzled Prussian veteran of the Napoleonic Wars had exclaimed during von Reisswitz’s display.⁸ This young wargaming advocate was nevertheless subsequently ostracized by his colleagues and committed suicide three years after his game’s endorsement.⁹ Some officers nevertheless saw the utility of wargaming in education in decision making; one of the earliest adherents was a certain Lieutenant Helmuth von Moltke (later labeled “the Elder”), who advocated using Reisswitz’s game just a year later. Once made chief of staff of the Prussian Army, von Moltke the Elder mandated wargaming as a part of a candidate officer’s academic preparation to become a member of the General Staff.¹⁰

Fast forward to 12 April 1997, the date of *Marine Corps Order (MCO) 1500.55, Military Thinking and Decision Making Exercises*, signed by then-Commandant of the Marine Corps, General Charles C. Krulak.¹¹ While there

were some tentative efforts to implement wargaming in the Marine Corps, none endured as a favored tool in professional military education for any meaningful length of time. There were isolated instances of force-on-force wargaming used in education here and there but nothing that was institutionalized across the Marine Corps.¹² The closest method and the most often employed decision game teaching technique was, first and foremost, the tactical decision game (TDG). TDGs were easy to implement and well-supported in the pages of the *Marine Corps Gazette*.¹³ While the Marine Corps Association bookstore in Quantico stocked commercial wargames next to the books listed in the Commandant's Professional Reading List, they eventually dwindled and disappeared altogether when the Avalon Hill Game Company and its subsidiary, Victory Games Company, went out of business.¹⁴

How Does the Educator Use the Game to Teach the Students?

As with selecting any specific teaching method, knowing what the educational outcome the wargame is meant to serve at the outset is foundational:

Wargames have . . . educational advantages for the study of war, because students must grapple with real strategic and tactical dilemmas as they struggle to beat their colleagues, and because the games show that the historical outcome of a conflict was not bound to occur. . . . As with any teaching method, the first priority when deciding to employ a wargame in class is to have a clear sense of the educational objective.¹⁵

This looks like a “Master of the Obvious” exhortation, but professional wargamers used to translating objectives into game design will say that it is not hard to give a wargame user what they want, but much more challenging to give them what they really need, especially if the user cannot verbalize the latter. It is best to pair the educator with a serious wargame expert to decide what kind of game is going to work in meeting the learning outcomes. Frequently, it means the learning objectives—those brief outcome statements that describe the measurable observables of knowledge, skills, and attitudes the student should exhibit—must be articulated with far more precision. This is also true when custom designing a wargame to fit an educational requirement when an existing commercial game cannot be found that suffices for the expected learning outcome.¹⁶

Of course, if faculty members are not familiar with serious wargames, it is hard to know what learning outcomes are best suited for educational wargame application. An educator teaching tactics might want their students to know the eight ways to gain advantage, per *Tactics*, Marine Corps Doctrinal Publication

(MCDP) 1-3.¹⁷ But the wargamer-educator is likely to ask if being able to describe these ways is enough. Might it be better if the student can demonstrate at least a proportion of them on a wargame board and provide a rationale that manifests a correct understanding of the concepts? The former objective might read something like “the student can describe, orally or in writing, all eight ways to gain battlefield advantage, in accordance with *Tactics*, MCDP 1-3.” But if the educational intention is that students should develop and practice military decision-making skills in applying this knowledge, another learning outcome can be added: “Provided a scenario in a tactical-level wargame, the student can demonstrate—through his game moves—and justify at least four of the eight ways to gain battlefield advantage, in accordance with *Tactics*, MCDP 1-3.” What remains is selecting the game that best supports this latter outcome, given the constraints of the facility resources and time available. Given the historical cases provided in this particular doctrinal publication, it might be best to select a wargame that covers one of them, such as the Gettysburg example, using a very simple title by veteran game designer Mark Herman, *Gettysburg Deluxe Edition*.¹⁸

Dr. Philip Sabin, former professor of War Studies at King’s College London, who specializes in employing wargaming in military history and theory classes, suggests the below categories of learning outcomes best suited for educational wargaming.¹⁹

Understand Relationships between Force, Space, and Time in Tactics, Operations, and Strategy

Novices in military judgment at any level of war do not immediately appreciate the potentials, implications, and consequences in employing a particular force array within a particular battlespace, either for their own side or their adversary.²⁰ In this author’s implementation of the Fort Lee Satellite Campus Command and General Staff College-developed game, *Baltic Reign*, student officers performing course of action (COA) analysis were surprised by the problems involving “the tyranny of distance” in deploying forces and sustainment to Eastern Europe, particularly when pressured to simultaneously win battles at the adversary’s geographical doorstep at the outset of operations.²¹ Deciding when, where, and why to offer battle—and when, where, and why to refuse it—is the very essence of operational-level decision making.²² In games, the students were usually eager to rush to failure—aiming to win initial battles—but getting themselves into an operational-level catastrophe as they could not sustain a string of tactical victories for long. Much depends not only on the present ratio of forces on the map but also the potential power correlation over time in key geographic areas, depending on various assumptions. Forcing the students to face such difficult decisions and accommodating the consequences—not only

the near-term ones but also the mid-term and long-term—is a large part of what they need to learn.

Likewise in the U.S. Army Command and General Staff College elective A681 History in Action, the author and the Fort Lee Satellite Campus military history professor employed simulation support from the Fort Leavenworth staff at the college, running the simple board game *Battle for Moscow* via a popular online computer program, VASSAL.²³ The overall educational intent of the course is to place students into historical situations where they must analyze problems and make military decisions. Through this method, they then can better understand and evaluate the decisions the historical commanders made. The curriculum is completely decision-game centered and employs wargames so that students must determine pertinent objectives, develop COAs, and evaluate their execution of the COA employed, considering the consequences that occurred in the game. Army officer students are directed to assess their plan and/or execution through the lens of the nine principles of war.²⁴ Certain principles, such as mass and economy of force, compel students to evaluate how well they balanced the correlation of forces against their formulated objectives—to include the enemy's as well as their own—given the time limit of seven turns to win. Both players must judge their performance in applying maneuver and achieving surprise or—frequently—how they ended up as the target of the same! Timing offensive action, metering the tempo of the advance, and knowing when to resist the temptation to attack are also major considerations. However, *Battle for Moscow* does not support analysis of the principle of unity of command, given that there is only one player per side. Despite this, the involved staff of the U.S. Army Command and General Staff College think the advantages the game offers outweigh its disadvantages.

Even with the preliminary readings describing the course of the campaign, students often remark how playing the game better illustrates the difficult decisions regarding sufficient force allocation to accomplish various competing geographic objectives, given the tight time constraints that their historical counterparts faced. They also learn that while the principles of war can be useful in providing an analytical lens and common lexicon to evaluate their performance and the opponent's performance, they are extremely difficult to employ prescriptively in formulating and executing a COA.

Working through Dilemmas in Decision Making within a Realistic “Decision Environment” Simulated in the Wargame

Dr. James Lacey described how senior field grade officers at Marine Corps War College grappled with the issues of formulating and implementing strategy in a commercial-off-the-shelf wargame, exposed to thorny problems they never had previously experienced at the national strategic level.²⁵ He employed a popular

strategic wargame, entitled *Triumph and Tragedy*, covering the later interwar period and continuing on through the entire course of World War II in Europe.²⁶ He based his selection on the game's portrayal of the economic and diplomatic instruments of national strategic power, not just the military instrument. Placing the students in the roles of the United Kingdom and United States negotiating teams at the 1943 Casablanca Conference, they had to settle disagreements on strategic priorities and execute their decisions on the game board, which forced them to accept the resulting consequences.²⁷

Figure 1. Army University's *Battle for Moscow* online wargaming competition



Source: U.S. Army Command and General Staff College, courtesy Dr. James Sterrett.

Experiencing the Interactive Dynamics of Friction, Uncertainty, Fluidity, Disorder, and Complexity in the Wargame Environment

This accords well with *Warfighting*, MCDP 1's characterization in chapter 1 on the nature of war and warfare.²⁸ Some games do this better than others as published, but any of them can incorporate these factors with minor modification. Popular methods include techniques to simulate limited intelligence through hidden units for both sides, either using pieces "face down" until revealed by scouting or combat, or in a "double-blind" session with an umpire adjudicating reconnaissance and surveillance reporting prior to and when in contact. Others incorporate variable movement ranges in difficult terrain and/or bad weather, delays or outages in unit communications, or random event/SNAFU effects using die rolls and/or cards.²⁹ Commercial tactical-level games often include ratings for unit and individual leader morale and tactical proficiency to discriminate between elite and conscript formation quality to crudely simulate the effect of fear when fighting battles, inexperienced formations either melting away more quickly or retreating more frequently.³⁰

The author ran several double-blind wargames using a very complex but popular system with his officers, customized in such a way that the situation would challenge their initial assumptions about the situation and encourage creative adaptation in execution to achieve the overall commander's intent.³¹

Figure 2. Wargaming Week 2019: student-led wargaming at the Naval Postgraduate School



Source: "Student-led Wargaming Offers Insights, Analyses into Future Conflict," Naval Postgraduate School, 5 August 2019.

The author would only teach the minimum of information for the participants to make basic decisions; these were then translated into game actions conforming to the rules. This particular game system facilitated not only a great deal of uncertainty with its rules for hidden (not seen on the board) units, concealed units (location of units seen on the board but not their composition), but also very high friction levels as weapons and radios malfunctioned, artillery rounds fell short, vehicles bogged down in difficult terrain, inadvertent fires raged given the right weather conditions and combustible terrain, stout units unexpectedly panicked under fire and green units surprisingly stood fast or rallied quicker than normal, units ran out of crucial ammunition when most inconvenient, and more. Repeated practice with the game inoculated the participants against expectations of perfectly executed plans, teaching them flexibility, adaptability, focus, and perseverance.

Exercising Creative and Critical Thinking Preparing for, Participating in, and Analyzing the Wargaming Event

Wargame participants find themselves confronted with their unintentional analytical biases in understanding and communicating their estimates, their arguments compromised by faulty reasoning most typically through logical fallacies.³² Wargaming quickly spotlights these problems in the public glare of examination by one's colleagues. The incentive to improve both one's thinking and the ability to communicate ideas effectively is irresistible. Dr. Lacey has

written about how often war colleges talk about improving the critical and creative thinking skills of their students but rarely give those same students practice in them. For him, wargaming is the best environment to remedy this deficiency.³³

As one example of this in the U.S. Army Command and Staff College A681 History in Action elective wargame, *Battle for Moscow*, students will take the initial disposition of German forces as a given and press against the Soviet defenses in both the north and the south of the game map, following the same concepts the Germans did historically. This example of anchoring bias comes naturally to new wargamers, as they are unsure of what to do differently and cannot judge the prospects for success given a different concept of operations. The problem is that the northern approach—while the shorter road to Moscow—is also the most heavily forested and fortified, enhancing Soviet defenses there. Some students decide to make the main effort in the south, where the path to victory may be the longest, but the terrain appears more suitable for a rapid mechanized advance. In the post-game after action review sessions the author facilitates, it is illuminating for the students to compare notes on the decision whether to equally weight the northern and southern advances, or to put all the mechanized forces in the south. We then compare these judgments to those of the historical commanders to understand why they did what they did. The additional historical context usually leads to discussions about the limitations of the game in replicating the environment. In this case, the severe difficulties the Germans had with sustaining their forces at this point in the campaign and the need to attack quickly after liquidating the Kiev pocket meant the Germans could not combine their two offensive prongs in the south.

Students thus get the benefit of practicing both creative thinking (e.g., doing something new that was not done historically) and critical thinking (e.g., understanding why that novel concept was not done in reality). These kinds of discussions usually lead to observations on what the game simulates well and—equally important—what it does not. Students then better understand George Box's famous warning, "All models are wrong, some are useful."³⁴

What Type of Wargame Works Best for the Learning Objectives?

Once the learning outcomes that wargaming can support are clearly stated, what kinds of games are most suitable for them? As Sebastian Bae and Major Ian Brown argue in their "Promise Unfulfilled: A Brief History of Educational Wargaming in the Marine Corps," there can be no single wargame that meets all potential academic requirements.³⁵ So educators have to be willing to compromise at some point, and determining just what things are absolutely necessary and what things are adjustable is part of the process in selecting a wargame to

Figure 3. 3d Marine Division *Memoir '44* wargame competitions



Source: official U.S. Marine Corps photo by Cpl Timothy Hernandez.

accomplish the learning objectives.³⁶ Here are descriptions of general types of wargames that can help educators decide whether or not a particular title will fit their specific learning outcomes and faculty/classroom facilities.

Role-playing Games (RPGs)

This is the most common way to translate tactical decision game (TDG) participant solutions into actual practice, through playing out a selected participant tactical order. The selected solution author becomes the overall unit commander, with other participants assigned roles as subordinate leaders, key staff, and even as partner forces or neutral actors.³⁷ The facilitator takes on the role of the adversary and guides the other participants along by describing what they sense as the order is executed on a map sketch. It is not uncommon for the facilitator to “kill” or otherwise incapacitate role-playing participants to complicate the situation, immediately assigning them other roles in the game.³⁸ Experienced facilitators have an adversary plan they use to guide their narrative story line; this they keep secret from the participants until the end, revealing it in the after-action critique.

The primary advantage to this technique is the relatively small facilitator preparation, overhead, and facility requirements compared to other wargaming methods. It does a great job allowing for high levels of uncertainty, replicating disorder and friction, as well as fluidity and complexity, with a minimum

Figure 4. Naval Postgraduate Students enrolled in the Wargaming Applications Course execute strategies designed and developed in their 11-week class



Source: official U.S. Marine Corps photo by Javier Chagoya.

of fuss. This type of game works best to simulate tactical-level scenarios. Instructors less confident of their ability to adjudicate combats can use various methods to generate random outcomes using cards or dice, as often used in commercially published role-playing games.

Some might quibble that because there are not two forces involved in free play—the facilitator is acting as the adversary instead of another player—that RPGs are not representative of a truly force-on-force wargame. There are perceptions that this approach is nothing more than the kind of experience *Dungeons and Dragons (D&D)* is, a fantasy game with players acting as an adventuring party and the facilitator as the “Dungeon Master.” For those who might be dismissive of this particular technique because of these perceptions, it must be said that the participant role-playing and game master approach adopted by the designer of D&D, Gary Gygax, was inspired by U.S. Army Captain Farrand Sayre, who described referee-controlled adversaries in games to test execution of tactical plans in the early 1900s.³⁹

Seminar Matrix Games

This technique, developed by Chris Engle, adapted the RPG idea to examine strategic challenges in complex environments.⁴⁰ It also involves a facili-

Figure 5. Naval Postgraduate School students participate in analytic wargames they designed



Source: official U.S. Marine Corps photo by Javier Chagoya.

tator, acting as an umpire or referee. Unlike RPGs, however, the players are not necessarily members of the same side executing at the tactical level. In matrix games, participants are separately competing (and/or sometimes cooperating) entities or actors, interacting in different ways depending on the circumstances—conflicting with other players on some occasions, standing aside in others, or making pacts to defeat a common enemy or working together to solve a common problem. While this type of wargame can simulate a complex tactical situation involving at least two sides (and often more), they are most successful simulating strategic and operational-level situations. Participants are national leaders, senior commanders, and other high-level influencers; some may oppose each other actively, some more passively, others may be neutral at the start.⁴¹

All participants are given a scenario to study and prepare for their decision making in the game; once the game begins, player decisions are submitted in a series of moves framed as arguments. These arguments propose a claim, specifying an action and outcome, with three reasons why the outcome would occur as a result of their action. For every move in the matrix game, each participant writes up the argument secretly. Deciding whether or not to share the actual claim and reasons (or fake ones) with partners, adversaries, or neutrals before-

hand is part of the game, crudely simulating information operations. All the arguments are collected up for that move and then adjudicated by the referee. Arguments that contradict each other are negated and the rest adjudicated, based on their internal logic in the face of competing lines of reasoning. The referee announces the outcome and the next move occurs. As much or as little time can be given for the players to interact with each other, to do a little bit of research, and to write up their move; it depends on the goals for the game and the amount of time needed to achieve them. As with the RPGs, cards or dice are frequently used to adjudicate various events when a stochastic element is necessary.⁴²

The open-ended nature of these games is their prime advantage; however, a good deal of effort must be expended by the facilitator in orienting the participants to the scenario. After that, the participants will supply the substantive issues for resolution in their arguments and the facilitator improvises based on these. Participants new to matrix games may be uncomfortable in how freewheeling gameplay seems to be until they realize how well this allows for wide-ranging creative thinking.

Colonel Jerry Hall and Lieutenant Colonel Joseph Chretien of the U.S. Army War College's Strategic Simulations Division praised the effectiveness of this method, particularly in exploring current and near-future security challenges compared to historical ones.⁴³ This makes sense as participants in such institutions are likely to have a better understanding of today's scenarios of concern and can more readily apply the game experience to enhance their understanding of those issues.

System Games

System games have more detailed processes and rules, whether they be RPGs, Matrix Games, manual board or miniatures wargames, or computer games. The more involved titles can provide a richer environment for the participants to execute within but can bound actions in undesirable ways if the rules or facilitators are too constraining. These games often are the most difficult to implement, and—if the games are not very simple—will usually require expert help in the form of contractors, outside faculty, and/or assistance from serious wargame hobbyists. An advantage of using a team expert facilitating the wargame system is that this frees the participants from having to learn the rules in detail. It can be enough to teach players the most basic features of the rules and spend more time on the situation, allowing the expert team to translate the player moves into game actions consistent with the rules. In nearly all cases, system games feature stochastic adjudication processes to regulate the probabilities and range of possible outcomes in combat. System wargame experts are

Figure 6. *Irregular Warfare* wargame at White Sands Missile Range



Source: official U.S. Army photo.

usually also good at explaining the outcome cause and effect relationships to the participants in convincing ways, particularly when those outcomes are not the ones players expected.⁴⁴

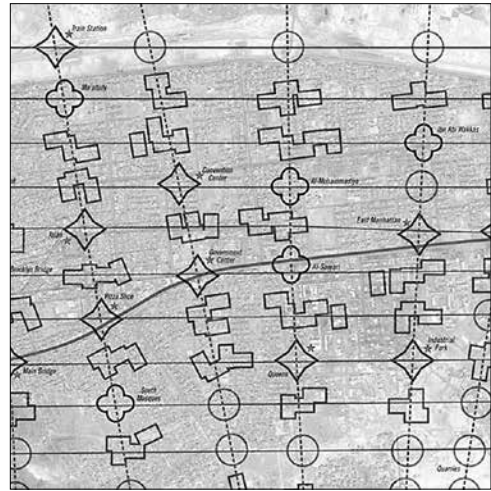
System games, by their very nature, provide an illusion of predictability, of control, given the nature of their databases, rules, and probabilistic adjudication tables. First-time wargame players with a preference for war as a science in the true Jominian spirit usually aim to formulate optimized plans. However, most system games will introduce an element of luck, often using cards and/or dice.⁴⁵ Such a representation forces wargame players to deal with a realistic degree of the fog of war and of friction; participants thus must do all they can to calculate probabilities of various outcomes and resulting second and third order effects for a given course of action. There are those wargamers (and military personnel playing wargames) who do not like this as such a greater or lesser degree of randomness undermines their perfectly formulated plans.⁴⁶ This, more than anything else, introduces uncertainty into what appears to be a straightforward problem-solving exercise.

Solitaire Games

This is a specific kind of system game or RPG that is explicitly designed for a single player, which usually rules out all Matrix Game approaches. A wide variety of these kinds of commercial/hobby titles exist for both computerized

and board wargames, with more and more sophisticated artificial intelligence (AI) engines.⁴⁷ Some games designed for two or more players contain provisions for at least one solitaire system-controlled player, affectionately termed “the ’bot,” that nevertheless can render a good solitaire experience. The best ones do not feel like puzzles that—once solved—result in the player winning every time thereafter. Many come in small, easy-to-learn packages and some in big, complex, and lengthy titles that can take months to finish the campaign game. For educational purposes, the smaller, quick-playing ones are going to be the most useful. U.S. Air Force War College (nonresident) used solitaire computer games mailed to its students as part of its correspondence course curriculum.⁴⁸ U.S. Army Command and General Staff College uses a single-move computer game, *The Grand Offensive*, to illustrate the conundrum of World War I trench warfare to support the H100 Military History curriculum.⁴⁹

Figure 7. Mapsheet for the solitaire wargame, *Fallujah, 2004: City Fighting in Iraq* (Decision Games, 2016)



Source: Board Geek Games.

Which Situations Are Best to Use— Historical or Hypothetical Scenarios?

Regardless of the type of game, the learning outcome might fit best with a historical situation that really happened, or a hypothetical one that might have occurred in history but did not, or a scenario that represents a current or near-future conflict possibility. This is where a division between hobby/commercial conflict simulation and professional wargaming shows itself, as the former tends to emphasize historical treatments and the latter demands contemporary to near-future ones.⁵⁰ The historical scenarios work well in letting students try out their plans to see if they could have done better than their historical counterparts, allowing some counterfactual options to pursue instead. Taking on the role of a historical commander in a well-constructed wargame of any type provides insight into the perceptions, pressures, decisions, and corresponding rationales. Wargaming breathes life into historical situations through immersive decision making. However, history educators do worry that the models cannot do justice in replicating the cause-and-effect relationships that solid historical

investigation uncovers.⁵¹ This requires critical assessment after the game is over, much like the A681 History in Action after action review discussions of what military history *Battle for Moscow* simulates well and what it does not.

The hypothetical current or near-future scenarios are often the most tantalizing for students as they are free from competing against the performance of a historical personage and able to test their mettle against that of their colleagues, unconstrained by history. However, while the model and data behind such games appear to be as good as that in the historical conflict simulations, they generally are not; the question is rather whether these are good enough for the purposes they are used for. Sabin warns us that hypothetical wargames are akin to forecasting the weather; the further out they attempt to predict the future, the less reliable such portrayals are likely to be.⁵² Still, they may provide enough of an alternative future/reality that the range of creative thinking might free players from their anchoring biases.

Teaching with Wargames—Challenges and Solutions Overcoming Design Bias

Like a book author, a wargame designer has a particular perspective on the subject at hand. In the best sense, this desire to use the wargame to provide lessons learned can be for a positive good. Often, the designer's purpose is different enough from the educator's that the game is not truly useful in achieving desired learning outcomes. However, it can happen that the designer's agenda in a wargame that is otherwise seemingly suitable for classroom use is simply too confining or even of questionable veracity. Historical wargame designers have their pet theories that are reflected in their commercial conflict simulations; Department of Defense (DOD) wargames and/or scenarios can often reflect doctrinal imperatives and conventional wisdom about organizational and weapon effectiveness.⁵³ This can be a danger when trying to "lift" a system or scenario designed for one context (e.g., support to a command post exercise or to demonstrate a specific warfighting capability to its training audience) to employ it for education. As such—whether employing a historical or a hypothetical scenario in a wargame, whether it is a commercial title or a government one—the potential for negative learning is ever-present, particularly given how immersive and compelling a wargaming experience is for the participant. Dr. Peter P. Perla warns that this must be deliberately countered through the after action review:

They [wargame participants and analysts] deserve and should demand an explanation of why events run counter to their expectations. They must be allowed, indeed encouraged, to be wary and skeptical and to question the validity of insights derived from the game until the source of those insights is ad-

equately explained. If the reasons underlying an insight seem artificial, the insight may be a false one, and the game system may be in need of correction.⁵⁴

Challenges of Time and Complexity

Most readily available commercial serious wargames take a long time to learn and an even longer time to understand its lessons. This can be mitigated by choosing simple games, designed to be easily played with learning outcomes clearly evident to the participants, even in a single session. This can often mean the instructor must self-design games or heavily customize existing ones. Professor Sabin found he often had to do this, and we have seen locally designed larger wargames at Marine Corps University, such as *Assassin's Mace* and *FMF*.⁵⁵ As mentioned earlier, another alternative when using a more complicated wargaming system is to facilitate gameplay by telling wargame players just enough to make required decisions, advising them against catastrophically bad judgments on the spot, with the facilitators applying detailed rules.

Considerations of Demands on Instructors

#1: Let Go of Convention

In the twenty-first century, developments in adult learning methods—*andragogy*—have challenged higher education professors to resist defaulting to the lecture and instead craft curriculum delivery involving a wide variety of techniques. From the “flipped classroom” approach to the palette of Liberating Structures creative thinking tools, it takes coaching, some experimentation, and plenty of practice to effectively apply them.⁵⁶ The major difficulty is getting instructors to let go of the “sage on the stage” model, which feels the safest for those new to teaching. Wargaming, as one of the types of decision gaming methods, can easily suffer from an uninformed perception that it is not a serious learning tool.⁵⁷ But even if instructors are open to new ideas in delivering subject matter, there are still a few hurdles to overcome.

#2: Obtain Relevant Expertise

Having both domain knowledge depth in a subject to be taught as well as expertise in teaching it is a challenge, especially for those new to teaching. Add to this the perceptions that wargaming is either too loose (RPG and matrix games) or too complicated (system wargames), it can be seen as ultimately too troublesome or intimidating to reliably apply in the classroom. This goes double for instructors who are not serious wargamers and especially those who might not have much more experience in their substantive topics than their students. When implementing wargaming into education, the capability and credibility of the instructor is central to success—as Johan Elg argues, “without instructor

buy-in, any attempt to conduct an educational wargame is likely to result in a 'complete failure'.⁵⁸ If the educator is not genuinely interested in wargaming's potential, the method will not work.

If this is at issue, there are three ways to overcome the challenge of instructor buy-in. The most commonplace solution is to team teach with a wargame, matching up the wargaming apprentice instructor with an experienced wargamer/educator in the classroom. The first way is to use the simplest wargame possible with a minimum of rules, or even just let the instructor implement their own judgments on movement, combat adjudications, and other outcomes resulting from participant decisions. That way the instructor feels in control of the game and the class. The second way is to let the experienced wargamer/educator teach the class with the wargame. Using that approach, much depends on personalities and the alignment of goals and methods between the guest instructor and the host. When there is such an alignment, the approach can be very effective. This takes a significant amount of extra preparation and post-class team coaching, but it is well worth the investment over the long-term. Third, instructors can hide the game from the players in either of the above cases, taking inputs from participants and communicating outcomes without any reference to the conflict simulation behind the adjudications.⁵⁹

Who are the right wargaming experts? Not all wargamers make the best partners when implementing serious games into the curriculum. Consider those with a track record of consulting, editing, and play-testing serious wargames for institutions and/or commercial wargame companies. Those with experience teaching—especially those who have already implemented wargaming into their courses—are the most valuable.

#3: Overcome Time Constraints

The vast majority of wargames—even computerized titles—can take a considerable amount of time to learn them well enough to play, and then even more time to learn to play well enough to be able to teach others. Time taken to learn the wargame as a student can be reduced by the instructor guiding the class through the process of translating decisions into game moves. Students are also not expected to learn to play the game well; winning, after all, is not the point, although it is certainly a motivation when playing. But for instructors, to know the game well enough to explain it in class and know it so well that they can improvise in implementing student decisions in the game routines, as well as advise the students on what does not work, requires both time and effort. As Sabin describes it:

Whereas one can skim quickly through books and articles to get the gist of the argument, or highlight only key points during a lecture or conference address, this shortcut is not eas-

ily available with wargames. Enthusiasts and military users are often prepared to spend days playing an individual game . . . as are some academics. . . . Time is hence at a premium within crowded conference schedules or within the standard weekly two-hour classes of a taught module.⁶⁰

There is no easy remedy for this issue; however, the gain in educational effectiveness is worth the cost of time invested. The best way to economize on the time requirement is to again have an expert wargamer/educator—one who knows the game used—to team teach it with an instructor who does not but is motivated to learn.

#4: Scope the Decision Environment Requirement

If wargames are all about decision making, then deciding what roles the participants must assume and what decision dilemmas those roles face must be explicitly articulated to find the best simulation. It is not uncommon for commercial wargames to put players in a number of roles simultaneously, say as a platoon commander as well as a company commander, but the corresponding learning objective should be in exercising company-level decision making. The best games in such a case might be more abstract ones that confine the player to a single role. Older commercial games often tantalized players with the ability to command at all levels—a big board or computer wargame on Gettysburg allowed players to maneuver individual regiments within a brigade as well as all the way up to the Army commander disposing of their corps on the entire battlefield. While they were attractive for simulating all the historical details and generating an illusion of complete control, such titles are much less attractive as classroom teaching devices. Recent commercial games—particularly manual ones—of limited size, scope, and time to play are far better. However, the wargame cannot be so abstract that decision making does not seem to correspond to player roles well or allows unrealistic behavior.⁶¹ Even so, the range of choices may not be wide enough and modifications to existing titles or completely customized in-house game designs will be preferred.

#5: Match the Right Wargame to the Learning Outcomes

Even if a particular conflict simulation game replicates the proper role of the players and creates a corresponding decision environment, the lessons imparted may not relate to the learning outcomes desired. For example, imagine an Enabling Learning Objective that students should be able to describe the transportation trade-offs made in extending the operational reach of a Joint force.⁶² The candidate wargame system successfully casts players in the roles of the Joint force commander and functional component commanders. So

far, so good. However, it does not replicate decision making regarding air and surface lift asset allocation priorities between deployment, unit maneuver in employment, and supporting sustainment for both. Whatever the merits of the game in portraying other Joint functions to support corresponding learning objectives, it is not suitable for this one. The way to avoid this problem is evaluating specific wargame candidates against learning outcomes; this is fairly straightforward:

These wargames should include some form of pre-wargame assessment (analysis) to better understand the current education/experience level of their players and a post-wargame assessment/analysis to determine if the wargame imparted the desired education/experience to the players.⁶³

#6: Access Wargaming and Wargaming Support Resources

Even if the other challenges to the instructor applying wargaming in the classroom are met, just trying to learn about the bewildering variety of wargames that might support various learning outcomes, identifying which ones are easily available, and obtaining sufficient serviceable copies can be difficult.⁶⁴ While wargame catalog websites cover a vast swath of titles (e.g., Board Game Geek as well as wargame company advertising on their sites), these descriptions are intended for hobby gamers, not educators. Trying to use advertising-style characterizations to get a sense of the decision environment and whether described titles will support learning outcomes is difficult, even though complexity, number of players, and time to play estimates are usually listed.

One does not usually find a large repository of wargames in university libraries or archival collections; ones that exist are usually a small handful of the thousands of titles and expansions published.⁶⁵ According to Sabin, it is hard for such institutions to shelve, store, and maintain a comprehensive collection; computer wargames rapidly become obsolete as operating systems are updated, some of the manual board wargames can be bulky and require inventorying of the many pieces and components to ensure completeness.⁶⁶ Incomplete sets require a good bit of work and some expense to either fabricate or purchase replacement parts. There are also quite a few wargaming magazines providing game analysis and variants, as well as designers' notes and historical interpretations, but these are so narrowly specialized that not many academic institutions are interested in them. Private collections in the hands of experienced hobby and professional wargamers remain the best resources, if one can find them.⁶⁷ The Board Game Geek website does allow users to maintain an inventory of personal collections useful for that purpose. As time goes by, some hobbyists and wargame companies are building and maintaining magazine archives, wargame replacement component scans, and other resources available online.⁶⁸

Many of the games described are long out of print but some noncollectors' titles are still available at reasonable prices on the secondary market.

Wargaming Supporting Education and Cohesion in Units

There is a natural tendency to want to implement a wargaming culture from the top down, but the real challenge is making it sustainable after the initiating leadership moves on. There are just too many other competing things to do. It may be best instead to leverage those Marines who are already wargaming in their off-duty time using games they are currently playing, encouraging them to get friends and colleagues involved, and giving them the resources to help in this. Once achieving a sufficient density of wargaming and wargamers, introducing serious wargames that are better aligned to education learning outcomes may then be possible, as well as rewarding Marines who repeatedly play them and teach others. These measures will better focus some of the interactive learning going on. Then Marine leaders can formalize incentives for particular serious wargame titles best supporting learning outcomes through competitions with recognition and prizes. Ideally, this will set sufficient examples for others to emulate and follow, spreading a Marine Corps wargaming culture.

Decentralize the Effort: Start at the Bottom

It is best to get Marines playing wargames, first and foremost, whether serious games or purely entertainment venues.⁶⁹ The most effective ambassadors for wargaming are other wargamers. Those folks will have their favorite games; leaders can let them know the command values wargaming as a hobby and wants them to encourage others to play whatever the existing wargamers like. These might be wargames on a tablet, on a laptop or desktop, board wargames, miniature/model figures and vehicles with rules and dice, role-playing games, anything. Because it is about learning how unit members think as well as practicing making lots of decisions, it does not matter as much what the specific games are. What matters is the competitive spirit, getting people used to the idea of losing, motivating them to improve, and setting the stage for a personal conversion experience for some to embrace serious wargaming as a hobby, if not yet a professional pursuit. Nothing works quite like word of mouth to get the word around and attract attention.

Incentivize Practice through Competitive Recognition

Once a significant number of Marines are playing, structuring a unit recognition and reward system is the next step. Here is also where leaders can leverage some of the popular serious wargames in the unit that better fit training and educational objectives as well as enhancing unit cohesion. This does not have

to involve a lot of time, effort, and expense; indeed, some of the existing wargamers likely will volunteer to set up tournaments for their favorite games. Rewards can be a unit certificate, a chance to park in a unit leader's spot for a day, recognition in a formation or unit email/newsletter/website, and other incentives. PME venues hosting competitive wargame tournaments can award prizes not only to individuals but competitive teams representing a school or other participating organizations; in this way, they help infuse wargaming culture into the operating forces and supporting establishment.

Widen the Wargaming Network

In 1990–91, when Captain Lance Clemens was the officer in charge of the Combined Arms Staff Trainer (CAST) at Camp Hansen, Okinawa, he suffered a shortage of competent command post exercise (CPX)-driver computer operators, colloquially labeled “pucksters.”⁷⁰ Given the continuing churn of Unit Deployment Program battalions coming and going on the island, enlisted and officer augments to the control cells were eager but inexperienced in serving as CPX pucksters. Being a wargame hobbyist, Clemens started a CAST wargame club on Saturdays, narrowly targeting the “barracks rats” in his advertising campaign to come out and play. He got enough participation to materially alleviate his problems in finding pucksters who could competently move and fight friendly and enemy units in computer simulations or tactile unit icons on a terrain board for CAST exercises.⁷¹

When he was the 1st Marine Division special services officer, Captain Don Chappell included commercial board and card wargames into unit deployment sets in the mid-1980s.⁷² Marines who played the games became interested in the hobby and attended the new Camp Pendleton Conflict Simulations Club on base starting in 1984. That same year, Chappell attracted a sizable number of *Squad Leader* players to play-test *Advanced Squad Leader* for the Avalon Hill Game Company, this author included.⁷³ Several of the club members would go on to play-test for commercial wargame companies, participate in competitive tournaments, and connect other military members to these organizations and events.⁷⁴

Military society chapters, wargame clubs, PME sessions on Friday afternoons, wargame demonstration days such as those the Warfighting Lab Wargaming Division has sponsored at Quantico in the past, informal brown bag lunch game demo events like those sponsored by the U.S. Army Command and General Staff College, U.S. Army War College, and Marine Corps War College, as well as online wargame competitions such as the U.S. Army Command and General Staff College *Battle for Moscow* VASSAL tournament are all ways to expose interested Marines to the advantages of serious wargaming, both as a hobby as well as a professional education and training venue. One notable example of

this is Marine veteran Sebastian J. Bae routinely sponsoring competitive games of his *Fleet Marine Force (FMF)* design online using Steam's Tabletop Simulator. While such "advertising" gets the initial word out, having a follow-up effort to take advantage of this—building and maintaining interest and enthusiasm within a close-knit wargaming network—is the most important.

Bend the Wargame Scenarios to Meet Educational Needs

Once the network is strong and sustainable, it is easier not only to inject the kind of games that more closely fit overall education and training objectives but leaders can also select and tweak wargame scenarios to achieve specific learning outcomes. As an example, the author ran one situation that led participants to face dilemmas regarding conflicts between their assigned mission and the overall commander's intent. He picked a historical scenario out of a commercial game and modified it to achieve this kind of conflict using a double-blind umpired method to replicate the fog of war, while the game system, *Advanced Squad Leader*, was renowned for its depiction of the friction of war. The players did not have to know the system beyond the very basics of moving and initiating combat; the author performed all these functions based on participant orders.

In the scenario, both sides were charged with missions securing a mixed business and residential complex in an urban environment. The scenario defender started with forces possessing the complex but depended on a line of communication (LOC) to their source of reinforcements unloading at docks on a river's edge. Both sides understood that the ultimate goal of the higher headquarters was to eliminate their opposition and securing the complex was a necessary first step. However, their performance in the game was articulated as accomplishing the specific mission. The attacking player, unaware of this adversary's LOC or reinforcement potential, initially deployed to storm the complex directly. When faced with a deadly surface of fortifications and stout automatic weapons fire, he first infiltrated past and subsequently maneuvered widely behind it, eventually spotting the oncoming enemy reinforcements. While the complex defender perceived this, he did not try to interfere or otherwise react to it for fear of weakening his defenses directly opposite the location of the initial attack. The player conducting the deep envelopment successfully ambushed the enemy reinforcements before they could reach the complex. He then subsequently surrounded the defenses, forcing the other player to spread out to hold onto everything, which he did not have the forces to do. Through this method, the attacking player eliminated the defenses from behind, not only achieving victory in his mission but erasing the enemy forces from the map—a decisive win by any measure.⁷⁵ The subsequent after action review was notable in discussing portrayals of surfaces and gaps, the dilemmas when choosing courses of

action between the stated mission and the commander's intent, and the advantages of ambiguity in maneuvering in the face of the enemy.

What Are the Things to Watch Out For?

Excessive Detail

When first looking at some of the wargame titles available today, it is easy to think these games reflect reality with a high degree of fidelity. Sometimes they do to a good enough standard. But even more often, they will not for various reasons; it takes a good bit of discrimination to find and fit the best wargame for the desired learning outcomes. There are many wargames that attract attention because they ooze detailed granularity in weapon and equipment performance, involved simulation of command and control, and even high logistics functioning fidelity and more. Hobbyists with all weekend to play a session have different desires than educators with only a few hours to accomplish their learning objectives. Other games are simpler, using a great deal of abstraction so that they are fast moving and fun. However, they may be abstracting out the very things requiring a bit more detail and providing fidelity in things that are not relevant to the desired instructional outcomes.

Excessive Entertainment

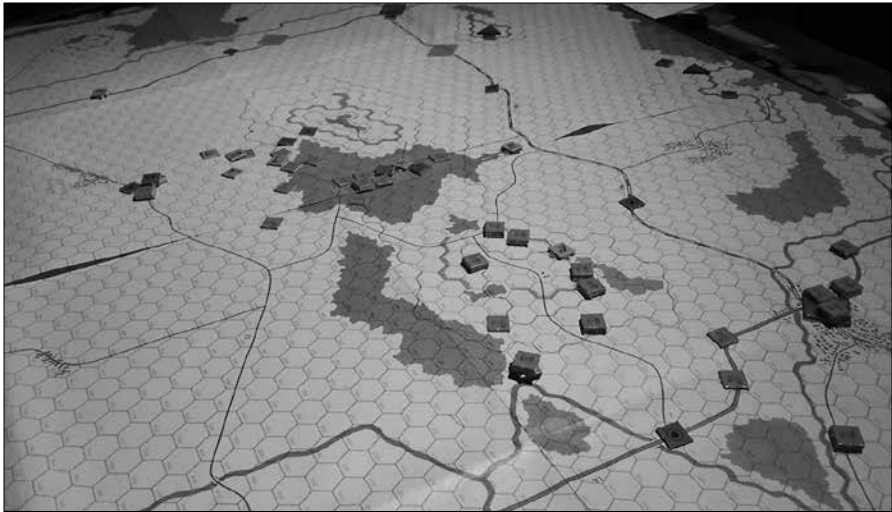
Most wargames designed for civilians are primarily intended to provide entertainment. Ten-minute paintball skirmishes and laser tag battles do not approximate a real firefight. Computer games—particularly the arcade style shoot-'em-ups (i.e., first-person shooter games)—are also prone to this problem. Board and computer wargames that emphasize realism can often suffer commercially if there is not a high dose of continuing excitement as well. Warfare, particularly at the tactical level, is often characterized by long periods of tedium punctuated with moments of sheer terror. This does not translate well into commercially successful wargames. Operational- and strategic-level wargames do not generally suffer from this problem as they are far more similar to what commanders and staffs do in the real world when “making war upon the map” (or on a computer display), frequently far from physical danger.

Official Indoctrination

We have covered the problems of designers' biases before. But one that is particularly difficult to resist in the military originates in molding game situations and scenarios to reflect official doctrine and/or assessments of weapons effectiveness. Both government and commercial wargame designers can easily fall victim to this, and it is hard to spot given all the institutional reinforcement. This is perhaps the hardest to overcome in hypothetical wargame scenarios.

Perhaps the most famous example of excessive indoctrination in DOD war-

Figure 8. The wargame *Firefight: Modern U.S. and Soviet Small Unit Tactics* (Simulations Publications, 1976)



Source: Board Geek Games.

gaming was the notorious Millennium Challenge 2002 evolution, sponsored by the U.S. Joint Forces Command. This was a concept development exercise, a wargame intended as an experiment to try out emerging ideas and technology, and not an educational wargame. Unfortunately, it became clear to the Red Force/Opposing Force (OPFOR) commander, retired Lieutenant General Paul K. Van Riper, that the advertisement of the game as “free play. . . . The OPFOR has the ability to win here” was not quite correct. As journalist and red teaming expert Micah Zemko termed it, “A concept development exercise that was intended to socialize the military around a leap-ahead, futuristic transformation ultimately left precisely the opposite impression.”⁷⁶ Fortunately, because of the negative press about this specific wargame, none of the scenarios used made their way into the PME schools or unit exercises to support educational goals.

As a contrasting example, James Dunnigan tells the story of his *Firefight* game, published for the Army in the late 1970s, which was supposed to simulate company-size mechanized combat in Western Europe.⁷⁷ He tried to use terrain representative of that in West Germany but was told not to. The Army doctrine of the day could be summed up in the following phrase: “What can be seen can be hit, what can be hit can be killed.” The Army wanted to highlight the deadliness of long-range direct gun and missile fire in the game. When published, the board looked nearly like open desert with a few small settlements, streams, and patches of trees here and there, but the game did reward engaging at maximum stand-off distances.⁷⁸

Despite Dunnigan’s attempts to impose chaos, units in the published game

always followed orders. The designer proposed to include microterrain, weather effects on visibility, and friction in command and control; all were left out of the game at the insistence of the contract sponsor.⁷⁹ Even if making honest attempts to minimize organizational parochialism biases, they can all too frequently still creep in and so must be guarded against.

In the aftermath of the 1990–91 Persian Gulf War, game designers pondered what might happen if the United States had to return to the Middle East in force. Twenty years after Operation Iraqi Freedom, such wargames—one titled *Back to Iraq* and published in three different editions—are now judged as quaint relics of a bygone age, given their naive assumptions about how such a war would be fought.⁸⁰ None of these games had any DOD sponsorship; the designers worked from open-source material freely available but fell victim to conventional estimates and warfighting wisdom. Getting it wrong when it comes to hypothetical simulation is an equal-opportunity hazard for wargame designers, whether they be DOD or commercial.

Ensuring True Expertise

In the commercial world, hobby consumers are a very discriminating audience and poorly designed wargames do not survive long in such a tight marketplace.⁸¹ Finding those who are expert in wargame application is a necessary requirement, and these are not often the technologists who are quick to sell their particular wargaming “box” or method.⁸² One of the difficulties within DOD in the past has been in growing uniformed servicemembers who not only play serious wargames but can design and conduct their own wargame sessions.⁸³ This shortfall is apparently well understood both inside and outside the halls of government, as there are currently initiatives to develop cadres and communities of professional wargamers.⁸⁴

Learning the Wrong Things

Negative learning is the worst thing that can happen in using wargames for educational purposes. Fortunately for Millennium Challenge 2002, the high-level visibility and controversy led to a widespread understanding of the limitations of the assumptions that led ultimately to its result. In this, the wargame served its wider purpose. But in Dunnigan’s *Firefight* game, players usually came away believing they would get many opportunities for long-range direct fire against Soviet tanks, when this would be rare in the broken and undulating terrain of Bavaria. It is fair to ask whether or not this was well understood at the time; Dunnigan clearly did not think so.⁸⁵ When using historical wargames or games dealing with fantasy or science fiction topics, one generally will not have as much of this problem. One can compare game performance to history in the former topical simulations and understand the fictional nature of the latter

games. As soon as one tries to model reality as it exists now, a great deal of personal bias creeps in. A one-time run through a scenario or situation is particularly bad. It only reflects one set of variables and—when stochastic resolution mechanisms are used—a single roll of the dice, no matter what the actual probability for a specific event might be. People will have an illusion that the one-time game experience will be close to how a similar actual situation will unfold.⁸⁶ Not even several replays of the game would be sufficient to achieve a good statistical sample, and—even then—one is beholden to the game designer's interpretation of reality.

The more realistic the exercise is perceived to be, the more people will want to use the experience and results of the wargame to validate their own ideas. This always happens implicitly, and we often find it going on explicitly. One of the deans of professional analytical wargaming, Dr. Peter Perla, adamantly warns:

In wargames, as in any approach to study and analysis, there is always a possibility that intentional or unintentional advocacy of particular ideas or programs may falsely color the events and decisions made in a game and lead to self-fulfilling prophecies. The designer of a game has great power to inform or to manipulate.⁸⁷

It is not uncommon to see military briefs advocating concepts or acquisition initiatives citing recent wargame experience as validating these ideas; certainly, that was the intent with Millennium Challenge 2002 and has been the author's own experience.⁸⁸ Whatever one thinks about this use, this is *not* what educational wargaming is all about. Educational wargaming cannot validate anything. The best thing that comes out of educational wargaming is participant self-confidence from doing this repeatedly—losing a lot at first but eventually winning on occasion, ideally more and more frequently with experience. This translates into character and corresponding levels of will, governed by experience/intellect.⁸⁹ When playing educational games on contemporary topics, experiences and results should always be compared to history to see if we are assuming too much in our favor that has little to no historical precedent.⁹⁰ After action reviews must cover not only lessons learned but lessons that should not be learned from the experience.

Too Constraining Learning Outcomes

Employing wargames to promote cohesion in unit PME sessions can also suffer from pitfalls. If bent on achieving very specific training objectives, such as practicing a night river crossing for example, this skews the situation, scripting the problem in a way that this desired event will happen. Such confining

parameters will rob the situation of much of the uncertainty and friction that real tactical decision making suffers from. It is akin to always practicing “long bomb” passes in football, or short lateral passes, or runs in set scrimmage plays where everyone knows what is going to happen. These are fine as rehearsals or drills, but they do not provide competitive scenarios in the truest sense. The group is not sufficiently put under realistic pressures to adapt when the enemy actively facilitates the night river crossing event and is restrained from defeating it outright.

Conclusion

It is an exciting time to be part of wargaming as one of the leading edges of the 2019 *Commandant's Planning Guidance*:

What we need is an information age approach that is focused on active, student-centered learning using a problem-posing methodology where our students/trainees are challenged with problems that they tackle as groups in order to learn by doing and also from each other. We have to enable them to think critically, recognize when change is needed and inculcate a bias for action without waiting to be told what to do. . . . We must cease viewing PME as something less strenuous and less challenging than other tours of service, and seek to make it as competitive and rewarding as possible.⁹¹

Injecting wargaming into professional military education, in formal schools, and in the units of the operating force—as well as the supporting establishment—will assist in providing a problem-posing methodology that challenges students to, as the Commandant says, “think critically, recognize when change is needed, and inculcate a bias for action.” This is what educational wargaming was historically intended to accomplish.⁹² The difficulty is that to make PME *more strenuous* and *more challenging*—comparable to those other tours of service—implementing wargaming will make greater demands on instructors.

Advocates for wargaming in formal school and unit education can be over-enthusiastic in their claims for the advantages of this teaching method. Like other innovative decision game teaching methods, such as TDGs and Decision-Forcing Case Method, serious wargames can deliver a lot when experienced hands implement them.⁹³ It is a fair question to ask how someone not so expert can learn how to use serious wargames in the classroom. For those interested in educating military judgment in decision making, it should be clearer what topics might be amenable to this particular technique. This should assist in formulating requirements for wargaming in education and effectively communicating with serious game experts who can craft implementation of serious wargames

in curriculum. We have seen the major advantages of wargaming that can be accrued when deliberately and thoughtfully implemented, but also some of the traps and pitfalls as well. Most of all, one can see how important instructor “buy-in” is to the effort and to using specific ways to overcome the challenges by using others more expert in educational wargame implementation.

Endnotes

1. “The Joy of Wargaming—The Pilot,” *War in a Box: Portable Wargaming on a Budget* (blog), 23 May 2020. The third paragraph emphasizes wargaming as a niche hobby, a sentiment echoed in a number of other wargaming social media sites such as Bruce Geryk, “Wargames in the Data Mine,” *Wargame_[space]: Thinking about History, Writing about Games* (blog), 17 August 2018. Admittedly, the wargaming community online is a smaller subset that can be fairly accused of living in an echo chamber. David Michael and Sande Chen, *Serious Games: Games that Educate, Train, and Inform* (Mason, OH: Course Technology, 2006), 17; Matthew B. Caffrey Jr., *On Wargaming: How Wargames Have Shaped History and How They May Shape the Future* (Newport, RI: Naval War College Press, 2019), 129, 202–3; Sebastian J. Bae and Maj. Ian T. Brown, USMC, “Unfulfilled Promise: A Brief History of Educational Wargaming in the Marine Corps,” *Journal of Advanced Military Studies* 12, no. 2 (Fall 2021); Maurice Suckling, “The Re-popularization of Commercial Wargames,” *Ludogogy: Playful Learning* (blog), 8 November 2020; Hamza Shabad, “Playing War: How the Military Uses Video Games,” *Atlantic*, 10 October 2013; Philip Sabin, “Wargames as an Academic Instrument,” in *Zones of Control: Perspectives on Wargaming*, ed. Pat Harrigan and Matthew G. Kirschenbaum (Cambridge, MA: MIT Press, 2016), 425, <https://doi.org/10.7551/mitpress/10329.003.0044>; and James F. Dunnigan, *The Complete Wargames Handbook: How to Play and Design Commercial and Professional Wargames*, 3d ed. (Lincoln, NE: Writers Club Press, an imprint of iUniverse, 2000), 6–7, 170; Michael and Chen differentiate “serious games” as “a game in which education (in its various forms) is the primary goal, rather than entertainment.” Caffrey noted an “explosion” in both board and computer wargaming in the 1990s and his description of wargaming in the military and academia is characterized as having reached a “tipping point” as of 2019. While there are signs of momentum across the Services and in defense-related academe, it is perhaps premature to characterize serious wargaming as widespread and enduring as of this writing. According to Bae and Brown, within the Marine Corps there has been a pattern of rising and declining interest in wargaming in military education before. Maurice Suckling lauds the comeback of commercial wargames, with the caveat that much depends on how you define a wargame. Increasing sales for board games in general do not necessarily correlate to sales levels for serious or hardcore wargames as they were in the 1970s and 1980s. As Hamza Shabad says about popular commercial first-person shooter (FPS) wargames, they are useful in quick eye-hand coordination training in “shoot/don’t shoot” situations but are not considered suitable for professional military education, a sentiment also echoed by Philip Sabin. Dunnigan goes further than simply deriding such “twitch” arcade-style games as educational tools; he questions the utility of computer wargames in understanding war and warfare since one cannot explicitly see the game engine and assumptions like one can in manual board wargames.
2. Dunnigan, *The Complete Wargames Handbook*, 213–14; and Eric M. Walters, “The Right Tool Wrongly Used,” *Fire and Movement: The Forum of Conflict Simulation*, no. 66 (June–July 1990): 38.
3. Dunnigan, *The Complete Wargames Handbook*, 221.
4. Gen David H. Berger, *Commandant’s Planning Guidance: 38th Commandant of the United States* (Washington, DC: Headquarters Marine Corps, 2019), 16; Jeff Wong,

- “Wargaming in Professional Military Education: A Student’s Perspective,” Strategy Bridge, 14 July 2016.
5. Sabin, “Wargames as an Academic Instrument,” 428; Philp Sabin, *Simulating War: Studying Conflict through Simulation Games* (New York: Continuum International Publishing Group, 2012), 21; and Dunnigan, *The Complete Wargames Handbook*, 6, 213–14, 221. James Dunnigan, the former president of Simulations Publications, and a major influence on wargame design, characterizes wargaming as “a hobby for the overeducated” and offers “wargames are not easy to master. It requires unique mental skills to deal with all that goes on in a wargame and make the game work.”
 6. Sabin, “Wargames as an Academic Instrument,” 421–22.
 7. Charles Homans, “War Games: A Short History,” *Foreign Policy*, 31 August 2011; C. G. Lewin, *Wargames and Their History* (Gloucester, UK: Fonthill Media, 2012), 40; and Caffrey, *On Wargaming*, 15–17.
 8. Caffrey, *On Wargaming*, 17.
 9. Lewin, *Wargames and Their History*, 43.
 10. Lewin, *Wargames and Their History*, 44. Von Moltke established the Magdeburg Wargaming Club in 1828 as a lieutenant and never lost his enthusiasm for the technique throughout his career.
 11. *Marine Corps Order 1550.55, Military Thinking and Decision Making Exercises* (Washington, DC: Headquarters Marine Corps, 12 April 1997).
 12. Bae and Brown, “Unfulfilled Promise.”
 13. MajGen Paul K. Van Riper, “Foreword,” in Maj John F. Schmitt, *Mastering Tactics: A Tactical Decision Game Workbook* (Quantico, VA: Marine Corps Association, 1994), ix–x.
 14. Peter L. de Rosa “The Fall of Avalon Hill,” *Strategist*, no. 29 (September 1998): 7–8. The author’s wargame recommendations in the pages of the *Marine Corps Gazette* in the 1990s encouraged the Marine Corps Association (MCA) to stock these Avalon Hill Game Company and Victory Games Company titles in the Quantico bookstore. The fate of wargame sales at MCA when Avalon Hill ceased operations was communicated to the author. Avalon Hill was subsequently bought by Hasbro but that company did not continue to publish the full line of previous titles, preferring instead to publish a handful of them and license production of others (e.g., *Advanced Squad Leader* to Multiman Publishing).
 15. Sabin, *Simulating War*, 37.
 16. “Effective Use of Performance Objectives for Learning and Assessment,” Teacher & Educational Development, University of New Mexico School of Medicine, 2005.
 17. *Tactics*, MCDP 1-3 (Washington, DC: Headquarters Marine Corps, 1997), 39–56. These are: (1) combined arms, (2) maneuver, (3) exploiting the environment, (4) complementary forces, (5) surprise, (6) trapping the enemy, (7) developing an ambush mentality, and (8) asymmetry.
 18. *Tactics*, MCDP 1-3, 27–29; and Mark Herman, *Gettysburg: Deluxe Edition* (Malibu, CA: RBM Studio, 2018).
 19. “Professor Philip Sabin—Biography,” King’s College London, accessed 2 August 2021.
 20. Sabin, *Simulating War*, 52–53, 85–90.
 21. Patrick Hulme and Erik Gartzke, “The U.S. Military’s Real Foe: The Tyranny of Distance,” 19fortyfive.com, 25 January 2021. The term *tyranny of distance* was first popularized by Professor Geoffrey Blainey’s title for his 1966 book, *The Tyranny of Distance: How Distance Shaped Australia’s History*. In contemporary military usage, it is meant as a caution not to depend on technology too much to overcome geographic remoteness that imposes logistical limitations. Designed by the Department of Sustainment and Force Management faculty member S. Bethel. Digital files for the game are available on the Educational Wargaming Cooperative (EWC) Google Drive folder under EWC Challenge ’21. *Joint Planning*, Joint Publication 5-0 (Washington, DC: Joint Chiefs of Staff, 2020), III-44–III-55.
 22. *Campaigning*, MCDP 1-2 (Washington, DC: Headquarters Marine Corps, 1997), 8.
 23. Frank Chadwick, *Battle for Moscow* (Hanford, CA: GMT Games, 2011). Browser-

- enabled and iOS versions of the game are available at Oberlabs.com. See also, the open-source boardgame engine, VASSAL.
24. James Jay Carofano, "It's Time to Return to the Principles of War," *National Interest*, 4 May 2016.
 25. Sabin, *Simulating War*, 37, 48, 53. To Sabin, the "decision environment" simulates the scale of decision making in real life given the roles of the players, including information received, the interactions involved, various time pressures in deciding, and the nature of decisions made/orders given. For decision dilemmas, see also Johan Erik Elg, "Wargaming in Military Education for Army Officers and Officer Cadets" (PhD thesis, King's College London, 2017), 215; and James Lacey, "Wargaming in the Classroom: An Odyssey," *War on the Rocks*, 19 April 2016.
 26. Craig Besinque, *Triumph and Tragedy: European Balance of Power* (Hanford, CA: GMT Games, 2015).
 27. Lacey, "Wargaming in the Classroom."
 28. Sabin, *Simulating War*, 61; and *Warfighting*, 5–13.
 29. SNAFU refers to "situation normal, all fouled up" from the less polite U.S. military term originating in World War II.
 30. This is not only true for ground combat games covering all historical eras but also naval and air wargames. Good examples of the latter include *Flying Colors: Fleet Actions in the Age of Sail* (Hanford, CA: GMT Games, 2005); and *Evasive Victory: The Air War over the Suez Canal, 1967–1973* (Hanford, CA: GMT Games, 2009).
 31. Don Greenwood, *Advanced Squad Leader Rules*, 2d ed. (Millersville, MD: Multiman Publishing, 2001); and *Beyond Valor*, 2d ed. (Millersville, MD: Multiman Publishing, 2000). The author had been a play-tester for this game system and core module (and another expansion), and it was one of very few games at this scale for the time. Today, there are many good tactical systems replicating the chaos of war at that level and any of them can serve a similar purpose.
 32. Sabin, *Simulating War*, 62.
 33. Lacey, "Wargaming in the Classroom."
 34. James Clear, "All Models Are Wrong, Some Are Useful," *James Clear* (blog), accessed 2 August 2021.
 35. Bae and Brown, "Unfulfilled Promise."
 36. *How to Master Wargaming: Commander and Staff Guide to Improving Course of Action Analysis* (Fort Leavenworth, KS: Center for Army Lessons Learned, 2020), 24.
 37. The author first experienced this in the Michael D. Wyly's graduate-level course, Contemporary Tactical Thought, American Military University, in 1993. After the author provided the solution to Wyly's TDG, he would then lead the author through a dynamic scenario to test how the plan could accommodate the unexpected. Wyly role-played the subordinate commanders, key staff, and external actors reacting to fragmentary orders received.
 38. Col Thomas X. Hammes, USMC (Ret), "TDGs Return," *Marine Corps Gazette* (blog), 1 May 2010. Marine Capt Mike McNamara enhanced the Wyly method of playing out solutions through this complicating factor. As Hammes relates, McNamara "started with the premise that TDGs are not just about teaching tactics but are really about teaching Marines how to analyze the fight they are in and, through lots of different games, learn how their fellow Marines think. The games are designed to provide the basis of the meeting of the minds essential to maneuver warfare."
 39. Jon Peterson, *Playing at the World: A History of Simulating Wars, People, and Fantastic Adventures, from Chess to Role-Playing Games* (San Diego, CA: Unreason Press, 2012), 275, 303, 309.
 40. Rex Brynen, "Engle: A Short History of Matrix Games," PAXsims, 26 July 2016.
 41. Elizabeth M. Bartels, "Wargames as an Educational Tool," *RAND Blog*, 8 February 2021. Bartels call this kind of matrix game application "role playing for peer-learning and community building."
 42. Tim Price, "Running Matrix Games," in *The Matrix Game Handbook: Professional Ap-*

- plications from Education to Analysis and Wargaming*, ed. John Curry, Peter Perla, and Chris Engle (Milton Keynes, UK: Lulu.com, 2018), 43. Price explains the “Simple Combat Resolution Using Dice (SCUD) technique”; and Johan Elg, “Effective Learning at the Swedish Defence University,” in *The Matrix Game Handbook*, 130.
43. Col Jerry Hall, USA, and LtCol Joseph Chretien, USA, “Matrix Games at the U.S. Army War College,” *PAXsims*, 2 September 2016.
 44. Johan Elg, “Instructor Buy-In: Pitfalls and Opportunities in Wargaming,” *Royal Swedish Academy of War Science Proceedings and Journal*, no. 2 (June 2019): 7. This is particularly true for military participants, who are all bent on winning and ready to label an adverse result as a problem in the simulation.
 45. There are system games that are completely absent an element of luck but remain very hard to win and not only in the way *Chess* or *Go* is difficult. Some games, like Avalon Hill/Hasbro Games Company’s *Diplomacy*, are multiplayer and human nature introduces a degree of uncertainty. Others use blocks that only the owning player can see the characteristics of the force represented until combat occurs using a linear algorithm with no dice or cards—combined with allowing the players great latitude in set up, such as in Simmons Game’s *Bonaparte at Marengo* and *Napoleon’s Triumph*, “perfect plans” are nearly impossible to carry out.
 46. Robert M. Citino, “Lessons from the Hexagon: Wargames and the Military Historian,” in *Zones of Control*, 443.
 47. That Cowboy Guy, “Simulating AI in Solitaire Board/Card Games,” *Indie Game Devlogs* (blog), 7 June 2017. This is a relatively comprehensive survey of commonly used techniques to simulate an opposing player. For computer wargames, AI methods remain something of a proprietary secret, but commercial manual wargames provide the best examples of a range of methods used. Some AI systems are intended to generate a rich narrative experience and can create a player sensation that they are just along for the ride, rolling dice or selecting cards to consult various outcomes on a table based on earlier game events and player decisions. Solitaire strategic bombing games, where the player is either a bomber commander or a fighter interceptor (Legion Game’s *Target for Today*, 2017; and Compass Game’s *Interceptor Ace*, 2019), or even a U-boat captain (GMT’s *The Hunters*, 2013) or a destroyer skipper (Legion Game’s *Picket Duty*, 2013) are representative of this genre. Others, however, have a very rich decision space where the random “chit draw out of a mug” AI feels quite unforgiving when the solitaire player makes a mistake (Hollandspiele’s *Agricola: Master of Britain*, 2016; and *Charlemagne: Master of Europe*, 2017) or the player takes action on specific areas of the map, triggering AI actions (Decision Game’s D-Day series). There are also multiplayer wargames where factions that do not have a human player will employ flowchart methods to guide the “robot” or “bot” decision making. GMT’s later COIN series games, *Fire in the Lake*, 2014, with the *Truong* expansion, 2020, for the Vietnam War, or *Liberty or Death*, 2016, on the War for American Independence are good examples, as is the wildly popular Leder Game’s *Root*, 2018, when played with the *Root Clockwork* expansion, 2020. A detailed description of these AI techniques would merit a long article/book chapter in itself.
 48. The author played two such games when completing this course in 1999–2000; one allowed the player to experiment with various force flows deploying into a theater, while the other enabled different air power sortie apportionment percentages for various missions in a Joint warfare scenario.
 49. Elg, “Wargaming in Military Education for Army Officers and Army Cadets,” 211.
 50. Sabin, *Simulating War*, 36.
 51. Robert MacDougall and Lisa Faden, “Simulation Literacy: The Case for Wargames in the History Classroom,” in *Zones of Control*, 450–51.
 52. Sabin, *Simulating War*, 62.
 53. Dunnigan, *The Complete Wargames Handbook*, 223–24, 228–32.
 54. Peter P. Perla, *Peter Perla’s the Art of Wargaming: A Guide for Professionals and Hobbyists*, ed. John Curry, 2d ed. (Bristol, UK: Lulu.com, 2011), 172.

55. Sabin, "Wargames as an Academic Instrument," 425–26; and Bae and Brown, "Unfulfilled Promise."
56. "What, Why, and How to Implement a Flipped Classroom Model," Office of Medical Education Research and Development, Michigan State University, accessed 10 August 2021; and "Liberating Education," *Liberating Structures: Including and Unleashing Everyone*, accessed 10 August 2021.
57. Sabin, *Simulating War*, 45.
58. Johan Erik Elg, *Wargaming and Military Education for Officers and Cadets*, 220; and Elg, "Instructor Buy-In," 6–10.
59. Elg, "Instructor Buy-in," 10–11.
60. Sabin, "Wargames as an Academic Instrument," 430.
61. Sabin, "Wargames as an Academic Instrument," 431, 434. According to Sabin, this is (1) due to the sensitivity to professional military wargaming, which is often classified; (2) the niche nature of hobby wargaming, usually the province of hobby buffs and not visible to the public as a whole; and (3) the dubious nature of the term "game" in the minds of most people, who think this is something for children and not serious adults. See also Perla, *Peter Perla's Art of Wargaming*, 17, for a 1990 characterization that arguably still holds true in some quarters, despite 30 plus years of wargaming's emergence in popular culture: "The fact is that wargames and wargaming are consistently misunderstood, denigrated, and even denounced, not only by gaming outsiders, but also by gaming proponents and practitioners."
62. "Terminal and Enabling Learning Objectives," Implementing NCI Course Curriculum, accessed 10 August 2021. "Each individual lesson of every course has enabling learning objectives that support behaviors that, taken together, facilitate the achievement of the terminal objectives. These objectives state what participants will know or be able to do as the result of a lesson." Terminal Learning Objectives are top level educational outcomes, whereas Enabling Learning Objectives are the intermediate "stepping stones" to achieve them.
63. Col Jeff Appleget, USA (Ret), Col Robert Burks, USA (Ret), and Fred Cameron, *The Craft of Wargaming: A Detailed Planning Guide for Defense Planners and Analysts* (Annapolis, MD: Naval Institute Press, 2020), 176.
64. "What Is the Average Size of a Wargame's Print Run?," Board Game Geek (discussion thread), accessed 2 August 2021; and Dunnigan, *The Complete Wargames Handbook*, 7. Despite the plethora of wargaming titles in the board wargaming arena today, most have very limited print runs and thus go out of print quickly. Quite a number of desirable titles are only available on the secondary (used and collector) markets, the most popular ones can command quite high prices for a single copy. Whereas in the 1970s and 1980s, a successful print run would be 40,000 copies or more (Dunnigan mentions runs as high as 50,000 to 100,000), today, 1,000–3,000 copies in a single print run is considered good. This specialization within the board wargame community arguably fragments what is already a niche community into several subniches. Game publishers aim to mitigate this by concentrating on series games that share a similar system but cover a wide variety of specific battles and campaigns. However, over time, these series have also proliferated to the point where there can be a dozen different systems portraying a topic, such as Napoleonic-era tactical warfare, each with its own fan base who often do not want to play their favorite battles in systems they do not favor.
65. Sabin, "Wargames as an Academic Instrument," 430.
66. Sabin, "Wargames as an Academic Instrument."
67. "Microbadge—Herculean Board Game Collector," Boardgamegeek.com, accessed 2 August 2021. The author's collection of more than 3,000 titles, expansions, and not counting complete runs of arcane wargame journals and fanzines, is not untypical for serious wargame hobbyists. Classified as a "Herculean Collector" (2,500 games or more), there are (as of 10 July 2021), 392 other Board Game Geek website members who earn that label. An additional 56 are classified as "Ultimate Collector," with 5,000 or more games. Of course, there are likely others with similar collection sizes who are

- not website members. So far, the author has yet to discover an institutional collection of similar size and topical breadth; such may exist but is not easily visible if so.
68. One good example is *The View from the Trenches* fanzine website collection of old Avalon Hill Game Company *The General* magazines spanning a couple decades of publications in PDF. Another example of replacement parts for some of these old Avalon Hill games is Camelot Games Company Store for mail order counters but also map boards and other components.
 69. Sebastian Bae, “Just Let Them Compete: Raising the Next Generation of Wargamers,” *War on the Rocks*, 9 October 2018.
 70. Author’s recollection as he attended these meetings while stationed on Okinawa.
 71. The author attended these game club meetings whenever he was on the island. There was another group of wargamers in the southern portion of Okinawa who would play in the Schilling Recreation Center on board Kadena Air Base every Saturday, although other types of board games were also played there.
 72. Author’s recollection as he was a member of 1st Marine Division when Capt Chappell was the special services officer; both he and Chappell were also members of the Camp Pendleton Conflict Simulations Club. Marines deployed to Camp Wilson, Marine Corps Air Ground Combat Center Twentynine Palms, CA, often appreciated Chappell including in-unit deployment kits to the Avalon Hill Game *Up Front*, a tactical WWII squad-level card game that required no board and therefore no table. Marines could play the game sitting on their cots.
 73. Capt Chappell would go on to win a 1986 national *Advanced Squad Leader* tournament, playing against opponents from all over the United States. Don Chappell, email interview with author, 26 May 2021.
 74. Besides the author and Capt Don Chappell, other notable members of the Camp Pendleton Conflict Simulations Club who went on to advise commercial wargame companies included Rich Hoffman, a key play-tester and rules editor for Compass Games’s upcoming title *Hitler’s Last Gamble: Designer’s Signature Edition*; Harold Buchanan, the civilian designer for GMT’s *Liberty or Death*, Decision Games’s *Campaigns of 1777*; and the upcoming GMT card game *Flashpoint: South China Sea*.
 75. This scenario was inspired by a situation in the vicinity of the Central Railway Station in Stalingrad in September 1942. The defenders presented elements of a mixed Soviet force with reinforcing companies from the 42d Guards Infantry Regiment against the well-led yet depleted forward battalions of the German *71st Infantry Division*.
 76. Micah Zemko, “Millennium Challenge: The Real Story of a Corrupted Military Exercise and It’s Legacy,” *War on the Rocks*, 5 November 2015.
 77. Dunnigan, *The Complete Wargames Handbook*, 233–51.
 78. Dunnigan, *The Complete Wargames Handbook*, 240.
 79. Dunnigan, *The Complete Wargames Handbook*.
 80. *Back to Iraq* (Bakersfield, CA: Decision Games, 1993). The first edition was published two years after the war in 1993, the second in 1999, with the third edition released in 2001. The game sports some fairly low ratings on the Board Game Geek website, as they are now arcane curiosities rather than valuable simulations of conflict given the context.
 81. Walters, “The Right Tool Wrongly Used,” 37–38.
 82. Stacie L. Pettyjohn and David A. Schlapak, “Gaming the System: Obstacles to Reinvigorating Defense Wargaming,” *War on the Rocks*, 18 February 2016; and Peter P. Perla, “Now Hear This—Improving Wargaming Is Worthwhile—and Smart,” U.S. Naval Institute *Proceedings* 142, no. 1 (January 2016).
 83. Jeff Appleget, Jeff Kline, and Rob Burks, “Revamping Wargaming Education for the U.S. Department of Defense,” Center for International Maritime Security, 17 November 2020.
 84. Bae, “Just Let Them Compete.” Bae has followed in the footsteps of Sabin’s course in wargame design at Kings College London through offering his own design course at Georgetown University and sponsors the Georgetown University Wargaming Society. Rex Brynen teaches simulation design and implementation in education at McGill

- University in Canada and Dr. James Sterrett offers an elective course in wargame design at the resident U.S. Command and General Staff College, Fort Leavenworth, KS. These are just a few representative examples.
85. Dunnigan, *The Complete Wargames Handbook*, 239–40.
 86. Perla, *Peter Perla's the Art of Wargaming*, 172. As Perla relates: “The power of a wargame to communicate and convince, however, can also be a potential source of danger. Wargames can be very effective at building a consensus on the importance of key ideas or factors in the minds of participants. They attempt to create the illusion of reality, and good games succeed. This illusion can be a powerful and sometimes insidious influence, especially on those who have limited operational experience.”
 87. Perla, *Peter Perla's the Art of Wargaming*.
 88. Zemko, “Millennium Challenge.” The author, as the Ulchi-Focus Lens (UFL) Command Post Exercise (CPX) planner at Combined Forces Command/U.S. Forces Korea (CFC/USFK) J2 (Intelligence), saw various DOD agencies and activities helping to resource the training event to “showcase” particular Joint intelligence capabilities, even though the exercise was not designed toward that end. As the G2 of Marine Forces Command in the latter half of the first decade of the twenty-first century, the author observed much the same in U.S. Joint Forces Command J7 Futures Battle Lab computerized simulations/wargames as well.
 89. Eric Walters, “Wargaming and Military Culture: Education and Cohesion Building” (PowerPoint presentation, March 2000).
 90. Col Trevor N. Dupuy, USA (Ret), *Numbers, Predictions, and War: The Use of History to Evaluate and Predict the Outcome of Armed Conflict*, rev. ed. (Fairfax, VA: Hero Books, 1985), 19–31. Dupuy uses quantified methods to predict weapons effects but finds these typically reflect weapons proving ground performance and do not account for historical conditions of terrain, weather, human factors, and other variables when comparing weapons performance statistical calculations to real-world outcomes.
 91. *Commandant's Planning Guidance*, 16.
 92. Applegate, Kline, and Burks, “Revamping Wargaming Education for the U.S. Department of Defense.”
 93. Bruce I. Gudmundsson, “Decision-Forcing Cases,” Military Learning Library, 11 November 2015. According to Dr. Gudmundsson: “A decision-forcing case is an exercise which asks students to solve a problem faced by an actual person at some point in the past. Because the problem is drawn from real life, a decision-forcing case is a type of case study. Because students are asked to provide specific solutions to a concrete problem, a decision-forcing case is also a kind of decision game. In other words, a decision-forcing case is both a case study that asks students to make a decision and a decision-game based on real facts. A case study that describes an event without asking students to make a decision is not a decision-forcing case. Rather, it is a ‘retrospective case study.’ Likewise, a decision game based on an imaginary scenario is not a decision-forcing case, but a ‘fictional decision game.’” Tactical decision games fall into this “fictional decision game” category.