

On Critical Thinking

It Takes Habits of Mind and Patterns of Inquiry*

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The traditional views of critical thinking focus on activities versus the development of critical thinkers under the premise that task familiarity equals competency. In this article, I argue that critical thinking is a journey, not a destination, and it demands that its travelers develop the habits of mind and patterns of inquiry required of one who aspires to the appellation of a critical thinker. However, the title is not important; rather, it is the ability to solve the most challenging issues that give purpose to those we think of as our critical thinkers. So, our quest here is to discuss how to find and prepare potential critical thinkers. Let's start with why this mission is so important.

This issue is critical to every discipline, yet none more so than the Air Force Airmen (and our joint team members) engaged in applying violence in deadly circumstances to achieve national objectives. The United States Air Force Academy lists critical thinking as the first of its nine outcomes for its graduates.¹ In its *2015 Future Operating Concept*, the Air Force highlighted critical thinking as an important skill 12 times throughout the document. The authors of this document noted that these concepts relied upon "Airmen who display critical thinking in

* The author borrowed this phrase from his colleague, Dr. Thomas A. Hughes, and thanks him for his insight into thinking and how we teach others.

complex situations, are educated and trained appropriately, and ultimately are empowered and entrusted to execute.”² In a speech given at the Brookings Institution, Air Force Chief of Staff Gen David Goldfein observed that in the development of commanders, education “is about the journey... about the campaign of learning, and lighting a spark.”³ Although his focus was on educating commanders, General Goldfein’s commentary applies equally well to those we want as our critical thinkers, some of whom may very well be those commanders the chief of staff comments on.

Often people ask the question, “What do I have to do to be a critical thinker?” Or they might ask the complementary question, “How can I tell if someone is a critical thinker?” These questions are interesting and important because most people focus on activity versus thinking. For example, if you are an officer in the military, you do not start a task from your boss with the statement, “Let me think about that issue, and I’ll get back to you.” Most of us simply need to know a suspense date and any constraints or restraints; in other words, as I learned as a lieutenant—how high to jump and for how long. If you rely on the former approach, it is not likely to endear you to your boss. The problem, I suggest, is one of focus—an over-focus on “doing”—often in response to a boss who yells, “Don’t just stand there... do something... anything!” In short, we often opt for action versus reflection.

What might account for such a focus on activity versus thinking? I will go out on a limb and suggest that for most of us, it’s in our DNA; it’s who we are. Most of us are science, technology, engineering, or mathematics (STEM) graduates—associate’s, bachelor’s degrees, or higher—and we tend to have Type A personalities. Usually, we are high-speed linear thinkers who move big rocks up big hills. We get things done. We are not the abstract thinkers to ask, “Why this rock?,” “Why this hill?,” or even better, “Can’t we just go around the hill?”⁴ No, we are the “Move, follow, or get the hell out of the way” action figures. The military requires many action-oriented people, especially in its junior ranks; however, it needs leaders with reflective, even abstract-thinking minds in its senior ranks where almost all problems have no single best solution.

As an example, I recall a trip in the early 1990s to participate with an operational planning group as the Ninth Air Force team packed for another crisis response to actions by Saddam Hussein in Iraq. Our task was to develop the first three days of an air tasking order designed to stop the Iraqis from moving south into Saudi Arabia. I joined officer alums from what was at that time called the School of Advanced Airpower Studies, now known as the School of Advanced Air and Space Studies (SAASS), as well as USAF graduates from the Army’s School of Advanced Military Studies as part of the planning team. Since no one issued us context or clear “what to do and why to do it” guidance, we started with

the problem handed to us but also went back a step to examine the regional, US, allies and partner viewpoints and inferred goals before we started to outline a plan and develop an air tasking order (ATO). A couple of hours into the process, a Ninth Air Force officer popped in to check our process and found us outlining the context and problem analysis for a strategy. With a colorful expression, he asked us what we were doing. We answered, and his response, delivered with expletives and high volume, was something like, “We don’t need an (expletive deleted) strategy! We need an ATO!” As I said, we get to a solution, so we can get things done, but we do not always determine just what our problem is and in what context before settling on an answer. So, how do we become critical thinkers *and* energetic doers?

I wish there were a course or a test to identify those of us who should be or could become critical thinkers. Unfortunately, there are many places, which can be found in a simple online search, that offer courses or test products promising to do just that. I found more than 95 million in less than a second (although some might be repeat hits). There are those who characterize critical thinking and do so in similar ways, as shown in table 1.⁵ Each of these definitions characterizes critical thinking as a skill or ability *emphasizing things to do versus ways to develop the ability to think critically*.

Table 1. Selected critical thinking definitions

| <i>Thinker Academy</i> | <i>Foundation for Critical Thinking</i> | <i>Wall Street Journal article</i> |
|---|---|--|
| <p>Critical thinking is simply a deliberative thought process. During the process, you use a set of critical thinking skills to consider an issue. At the conclusion, you make a judgment about what to believe or a decision about what to do.</p> <p>There are a number of critical thinking skills. A core set includes the following:</p> <ul style="list-style-type: none"> • suspending judgment to check the validity of a proposition or action; • taking into consideration multiple perspectives; • examining the implications and consequences of a belief or action; • using reason and evidence to resolve disagreements; • re-evaluating a point of view in light of new information | <p>A definition:</p> <p>Critical thinking is the art of analyzing and evaluating thinking with a view to improving it.</p> <p>The result:</p> <p>A well-cultivated critical thinker:</p> <ul style="list-style-type: none"> • raises vital questions and problems, formulating them clearly and precisely; • gathers and assesses relevant information, using abstract ideas to interpret it effectively; • comes to well-reasoned conclusions and solutions, testing them against relevant criteria and standards; • thinks open-mindedly within alternative systems of thought, recognizing and assessing, as need be, their assumptions, implications, and practical consequence • communicates effectively with others in figuring out solutions to complex problems | <ul style="list-style-type: none"> • “The ability to cross-examine evidence and logical argument. To sift through all the noise.” –Richard Arum, <i>New York University sociology professor</i> • “Thinking about your thinking, while you’re thinking, in order to improve your thinking.” –Linda Elder, <i>educational psychologist; president, Foundation for Critical Thinking</i> • “Do they make use of information that’s available in their journey to arrive at a conclusion or decision? How do they make use of that?” –Michael Desmarais, <i>global head of recruiting, Goldman Sachs Group</i> |
| <p>Sources: <i>Thinker Academy</i>, https://criticalthinkeracademy.com, <i>The Foundation for Critical Thinking</i>, https://www.criticalthinking.org, and <i>Wall Street Journal</i>, https://www.wsj.com/</p> | | |

A new trend in this discussion is the idea that we need strategic thinkers with specific skills. Table 2 offers three examples of desired skill sets. However, each of these descriptions focuses on “required/desired” skills for the critical thinker yet provides little to tell us how one acquires these skills. I find critical thinking tests even more problematic.

Table 2. Ideas as to selected critical/strategic thinking skills

| <i>Center for Simplified Strategic Planning, Inc.</i> | <i>Harvard Business Review</i> | <i>US Army War College</i> |
|--|---|---|
| The abilities to: <ul style="list-style-type: none"> • use the left and right brain • develop a clearly defined vision • clearly define objectives and develop a strategic plan • design flexibility into a plan • be aware and perceptive • be lifelong learners • take time for oneself • seek advice from others • balance creativity with realism • be nonjudgmental • be patient | Four ways to improve strategic thinking skills: <ul style="list-style-type: none"> • Know: observe and seek trends. • Think: ask tough questions. • Speak: sound strategic. • Act: make time for thinking and embrace conflict. | To develop strategic thinking (ST) leaders: <ul style="list-style-type: none"> • Learn the fundamental framework for ST (basic) • 10 three-hour blocks for practical application (intermediate). • Incorporate practical exercises to address problems faced at the three and four-star general level. |

Critical thinking tests examine a range of the skills experts think that critical thinkers *should do*. For example, the Watson-Glaser Test examines five areas looking first at inference abilities, then recognition of assumptions, followed by deduction capability, then interpretation abilities, and finally talents in an evaluation of arguments.⁶ The California Critical Thinking Skills Test uses a similar framework; however, its developers first examine analysis abilities, then those pertaining to evaluation, followed by inference, then deduction, and finally the capabilities of overall reasoning skills. There are other such exams, but they are variations on the theme for the two examples discussed here. The question for us to ask is, “What do these standardized tests tell us?”

In the early 2000s, the Air University faculty and students had the opportunity to participate in a critical thinking workshop using the Paul and Elder program from their Foundation for Critical Thinking Methodology program and then take the California Critical Thinking Skills Test.⁷ The data from this exercise did not show statistically significant differences in results from various student groups (early/mid/senior career personnel) or the faculty. While the data puzzled us, the pressure of “next on the academic calendar” prevented the faculty from conducting a deeper analytical examination of the results.

During the 2015–16 academic year, an Air War College (AWC) student sought to reprise the study of critical thinking skills analysis in his thesis research project. His work focused on a representative group of active duty officers attending the AWC, Air Command and Staff College (ACSC), and the SAASS.⁸ This researcher, Col Adam Stone, published his work in *Air & Space Power Journal* in an article titled, “Critical Thinking Skills in USAF Developmental Education.”⁹ While I do not take issue with his methodology, I do take issue with the implications he draws from an admittedly small sample size delivered without the benefit of test preparation.

Stone used the Watson-Glaser Critical Thinking Appraisal (WGCTA) to assess active duty Air Force student respondents from three groups: the ACSC, SAASS, and AWC—the top 20 percent of their peer group. He concluded that there were no statistically significant differences in scores between ACSC and AWC participants and only a minor variation between the SAASS and ACSC students, observing an average score in the 36th percentile, “compared to the graduate degree normative group.”¹⁰ His implications infer that the USAF and DOD now have a method to measure critical thinking (CT) and that a trained faculty could transfer CT skills to students through recurring instruction during the academic year. In assessing these conclusions and implications, let’s first start with a question: “How would any of us fare if we took the Scholastic Aptitude Test, American College Test, or the Graduate Record Examinations without preparing for the exam?”

Like the exams in the question above, the WGCTA is a standardized test with all the strengths and limitations of such an exam. I was not surprised that USAF officers taking the course without preparation scored as they did. As I examined the underlying logic of this test, I found I would have answered about half the questions in accordance with the test designers’ logic, but I would never correctly answer the other half. Why? Because I do not natively think with the same logic of the test designers. If one wants to score higher on a standardized test, then you must study the logic of the exam design, whether for a college entrance or critical thinking test.

In the over 15 years I have taught or been responsible for the education of well more than 1,000 students, I have watched them read the same material, have discussions together in seminar, and received the same essay questions, yet I have never seen the same answer twice.¹¹ My conclusion: we all think differently. At SAASS each year, we see the CT skills of students reach new plateaus in their analytical talents measured from their first essay efforts to the thesis product each officer defends to two examiners at academic year’s end. So, let’s change the initial questions about CT from the “skills of doing CT” to one that asks, “What are we looking for that would indicate the potential to become a critical thinker?”

In traditional teacher fashion, I would answer, “It depends.” Are you looking for the critical thinkers for the world of perhaps SpaceX or strategists for the USAF and the nation (the SAASS objective)? In his book titled *Elon Musk*, author Ashlee Vance offers the following insights into the SpaceX hiring model. The company wants college engineering graduates from top schools, top marks, and Type A personalities. But they don’t stop with looking for well-educated engineers who have a “get things done” personality. They dig deeper to find the person who excelled in robot-building competitions, hobbyists in anything mechanical, passionate yet able to be a team member, and “real-world experience bending metal.”¹² At the risk of a bit of reductionism, I offer that SpaceX looks for people who grew up trying to apply creative solutions to mechanical challenges. In the engineering “world,” I opine that companies seek these people to become the innovative critical thinkers for their futures.

So, how do “we” find such individuals we could develop into critical thinkers as strategists? The USAF has a well-developed list of skills it wants its officers to possess or grow into during their careers. I suggest such an approach helps the USAF find the people to “do things”; however, I do not find this approach helps locate those who might be future innovative critical thinkers. Instead, I look for people with wide-ranging interests in the world around them. In short, I look for those who are insatiably curious. I like to ask prospective critical thinkers about their music interests, hobbies, and reading habits (magazines, journals, and books). What looks great for a prospective critical thinker? The person with an eclectic taste in music, hobbies they substantially invest themselves in, and a wide range of reading choices. What does not look so good? These are the people who like both kinds of music—country and western, have limited outside interests, and only read the funny pages.¹³ I want to find those who are insatiably curious. These are the people the Air Force should search for in both recruitment and future promotion.

At our small school, we work to help our students develop habits of mind and capture the patterns of inquiry from the books and articles read during the academic year. One way we instill habits of mind is in the formal courses we offer, which organize material into what we hope is a coherent series of learning. The habit develops and manifests itself, at least initially, in the thesis project that each student designs, develops, and delivers during the year with us. We challenge our students to find the patterns of inquiry each author(s) used to solve the difficult question or problem found within each book or reading and encourage them to gather up these “patterns” and keep them available for the challenges they will face in the future. Now, we do not expect any “pattern” studied at SAASS to be the right answer for a future problem, but we do expect our graduates to use their developing habits of inquiry to produce their own lines of inquiry to develop in-

novative methods to solve the difficult challenges we know will come their way. The continued feeding of the mind—the habit—in a disciplined manner that collects the patterns of inquiry from each book or article read is the kind of critical thinker we look for in a future strategist.

The Air Force could “test” for its critical thinkers, but I suggest it would fall short of its desired goal to find and produce an officer corps that can innovatively think critically about the challenges of the day. While a standardized test could provide a baseline, the only way to improve scores on such an exam is to conduct a preparation course for such a test. While I offered a way to look for potential to think critically and innovatively, I would never say we produce critical thinkers. Rather, we produce officer graduates who can pursue knowledge in disciplined ways using their habits of mind and seek ways to solve great challenges with innovative patterns of inquiry. But at SAASS, we only place our graduates on the path to become critical thinking strategists. To stay on the path, they must continually develop the mind and sharpen the patterns that lead to innovative solutions to the most challenging tasks. They leave us with their insatiable curiosities enhanced with habits of mind and patterns of inquiry. These abilities mark the critical thinkers in the work of creating strategies to solve the most difficult challenges.

SAASS is not alone in this effort; most graduate schools strive to produce critical thinkers, whether in history, political science, engineering, or another endeavor. While there is value in learning “what” critical thinkers do, I suggest it is more important to find the insatiably curious and develop their habits of disciplined study so they can take the patterns of inquiry and apply them—most likely recombine them—in innovative ways to solve the most difficult challenges facing our Air Force and the nation. At SAASS, we know we are but a way station helping to develop critical thinkers, knowing that critical thinking is not a destination but a way of life requiring a lifetime of dedication to stay on its path. If we cease to develop our minds or lose sight of those patterns of inquiry, then we leave the path of the critical thinker. Our hope, of course, is that every Air Force member would aspire to the path and become the innovative critical thinker our service and nation will need in the future.

If the Air Force wants to recruit and develop critical thinkers, it should recalibrate its perspectives on recruitment and evaluation. Recruitment should include more than a STEM degree and a good score on the Air Force Officer Qualifying Test (AFOQT). Like the folks at SpaceX or in our search for strategists, the Air Force needs to look for the insatiably curious, and that is more of an interview process than a standardized test (yes, the AFOQT is a standardized test). Regarding an evaluation of human capital, we need to get beyond performance reporting focused solely on past activities and begin to search for evidence

of insatiable curiosity. Searching for the former and documenting the latter should give the Air Force the inside track to find and hopefully develop critical thinkers with the ability to guide their own journeys with their own habits of mind and patterns of inquiry. ✪

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Notes

1. United States Air Force Academy, “Outcomes,” accessed 26 June 2019, <https://www.usafa.edu/>.
2. Department of the Air Force, *Air Force Future Operating Concept: A View of the Air Force in 2035* (Washington, DC: September 2015), <https://www.af.mil/>.
3. Gen David L. Goldfein, USAF chief of staff (address, Brookings Institution, Washington DC, 19 February 2019).
4. Some of the comments herein come from my chapter titled, “Two Sides of a Coin: The Strategist and the Planner,” in *Strategy: Context and Adaptation from Archidamus to Airpower*, eds. Richard J. Bailey Jr., James W. Forsyth Jr., and Mark O. Yeisley (Annapolis, MD: Naval Institute Press, 2016), 232–52.
5. These hits resulted from a Google search using the term *critical thinking*. The specific sources for table 1 are found at Winston Sieck, “Critical Thinking Skills: What Are They, and How Do I Get Them?,” Thinker Academy, accessed 10 July 2019, <https://thinkeracademy.com/critical-thinking-skills/>; and Melissa Korn, “Bosses Seek ‘Critical Thinking but What is That?,”” <https://www.wsj.com/articles/bosses-seek-critical-thinking-but-what-is-that-1413923730>.
6. One can download practice tests off the internet or go to the Think Watson website at <http://www.thinkwatson.com/> for a range of testing and evaluation services.
7. See the Paul and Elder website and services at <https://www.criticalthinking.org>. You can find additional information on the California Critical Thinking Skills Test at the website, <https://www.insightassessment.com/>.
8. The Air War College (AWC) is the senior development education program of the Air Force teaching leadership and ethics, joint war fighting, strategy and policy, global and regional studies, and national security and decision making to senior officers. The Air Command and Staff College (ACSC) teaches a similar course of learning but at the operational level of activity with a focus on developing first-time commanders and staff officers. The School of Advanced Air and Space Studies is one of the DOD’s Advanced Studies Group programs with its focus on producing strategists. Officers selected for this program have completed ACSC but have not yet finished AWC.
9. Col Adam J. Stone, USAF, “Critical Thinking Skills in USAF Developmental Education,” *Air & Space Power Journal* (Summer 2017): 52–67, <https://www.airuniversity.af.edu/aspj/>.
10. Stone, “Critical Thinking Skills,” 63.
11. Sadly, the only exception would be for plagiarism.

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12. Ashlee Vance, *Elon Musk* (New York: Harper Collins Publishers, 2015), 220. The author goes on to quote Dolly Singh at SpaceX who stated, “We were looking for people that had been building things since they were little.”

13. Please know that I use country and western music as a foil and mean no disrespect to a musical art form I enjoy listening to.