Lesson Plans for Thinking-in-Time
(Module 1)

1. Overall Terminal Learning Objective.

Thinking-in-Time: A Scenario-based Developmental Method for Army Officers is designed to be conducted through four web-based interactive modules. The Terminal Learning Objective (TLO) for the four modules is:

Action: Demonstrate the Thinking-in-Time cognitive reasoning skill by which the *dimension of time* (past, present, and future) is used to support the decision-making process.
Conditions: Given computer based experiential learning activities, explanation of terms, readings, SME videos, and scenario based feedback.
Standards: The demonstration includes—
1. Define and explain the framework for Thinking-in-Time. (Module 1)
2. Techniques for identifying biases and understanding the past. (Module 2)
3. The Thinking-in-Time process for understanding the present. (Module 3)
4. Techniques for identifying biases and anticipating the future. (Module 4)
Learning Domain/Level: Cognitive/Evaluation

2. Scope (Overall)

The big ideas behind this instruction are:

- To be an effective strategic thinker you must be able to think-in-time.
- Thinking-in-Time complements, not complicates doctrinal processes and systems
- We use the past (learned and personal experiences) to understand the present.
- When considering future actions, we use analogical reasoning (deliberately or by default) to develop approaches.
- Our views on the utility and relevance of the past will affect the type and nature of analogies we consider and the lessons we draw from them.
- Cognitive biases can impede effective thinking. Awareness of these impediments and techniques to control them can promote better understanding
- Institutional memory/organizational history and military culture can imperceptibly influence our thinking-in and about time.
- The echelon of the organization, the operational environment, and the nature of the operation(s) being executed all dictate different considerations of time as a variable.
- Historical events can serve as cautionary events to be avoided or be used in scenario/plan development to anticipate and forecast the future.
- Realization of the above can be used to recommend or make better decisions.

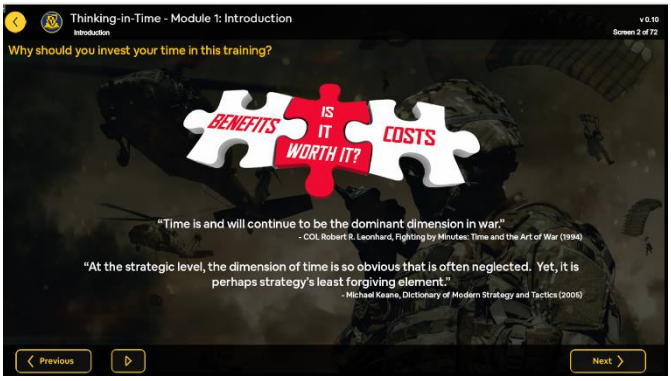
3. Enabling Learning Objective (ELO) for Module 1

Action: Define and explain the framework for Thinking-in-Time.
Conditions: Given computer based experiential learning activities, explanation of terms, readings, and SME videos
Standards: The explanation includes—
1. The definition of Thinking-in-Time
2. The framework and lexicon for Thinking-in-Time

3. Techniques for Thinking-in-Time

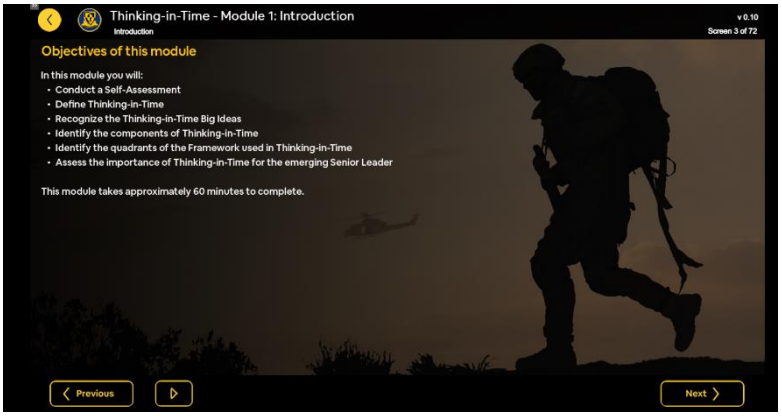
Learning Domain/Level: Cognitive/Comprehension

4. Conduct of the Lesson. The lesson begins by getting the student to think about investing their time in the course and the nature and importance of time to warfare by introducing two quotes.



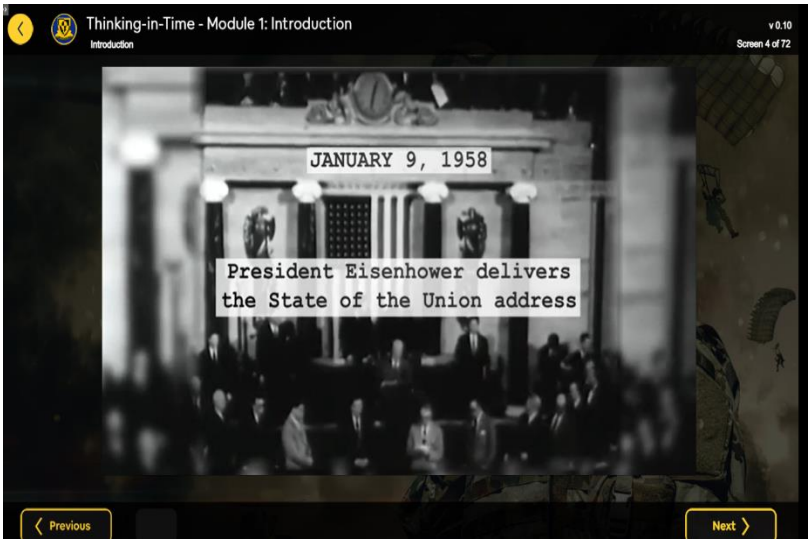
5. Scope (Module 1)

This module introduces the *Thinking-in-Time* definition, components, framework, subsequent modules (2-4), and topics for further study and self-development. The lesson is divided into eight sections.



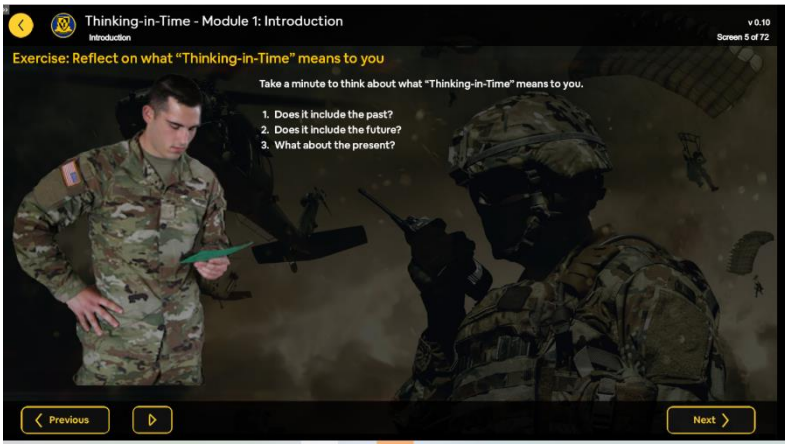
- What is Thinking-in-Time
- Conduct a Self-Assessment
- Define Thinking-in-Time
- Thinking-in-Time - Big Ideas
- A Framework for Visualizing Thinking-in-Time
- The importance of Thinking-in-Time for the emerging Senior Leader
- Additional Modules

a. Concrete Experience:
(1 minute video).
"DARPA -Breakthrough Technology, Past, Present, future." The goal of the concrete experience is to get the students to think about what is involved in Thinking-in-Time. The first 38 seconds is President Eisenhower delivering the State of the Union in JAN 1958, describing the need to take action today to be ready or the future. Eisenhower was born in the era of the horse and buggy. He ushered in the space age.

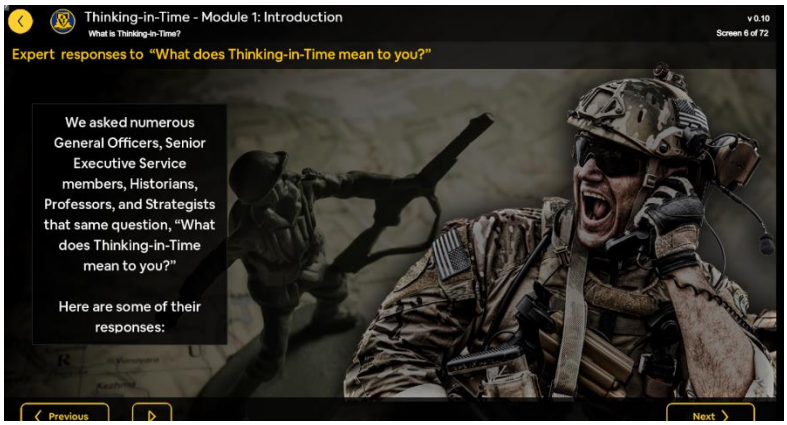


b. Publish and Process: (4 minutes).

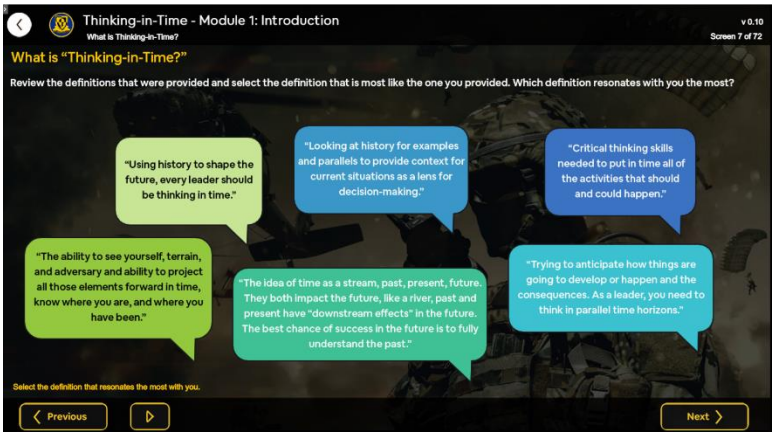
(1) Self-reflection. ***What does "Thinking-in-Time" mean to you?***



(2) ***"We asked numerous general officers, senior executive service members, historians, professors, and strategists that same question, - what does thinking in time mean to you - here are some of their responses…***

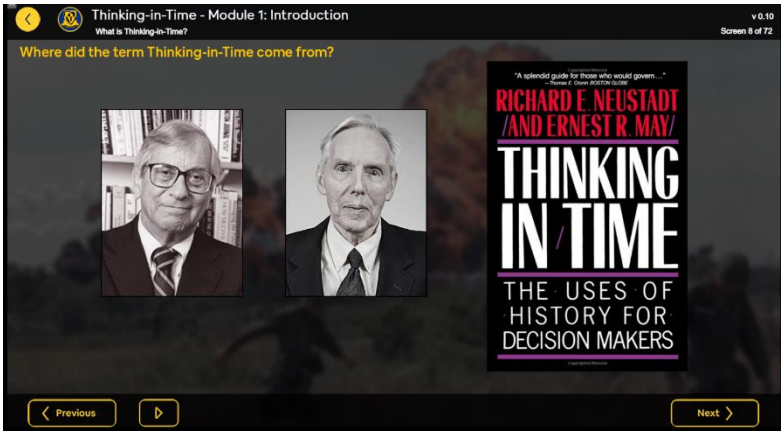


(3) **SME Quotes on "*what does thinking in time mean to you?"*** They see a series of quotes from our SMEs. Purpose: Allows them to consider alternative viewpoints by esteemed professionals. Culminates with the reflection question, ***"Look at the definitions again. Which definition is most like the one you provided? Which definition resonates with you the most?"***



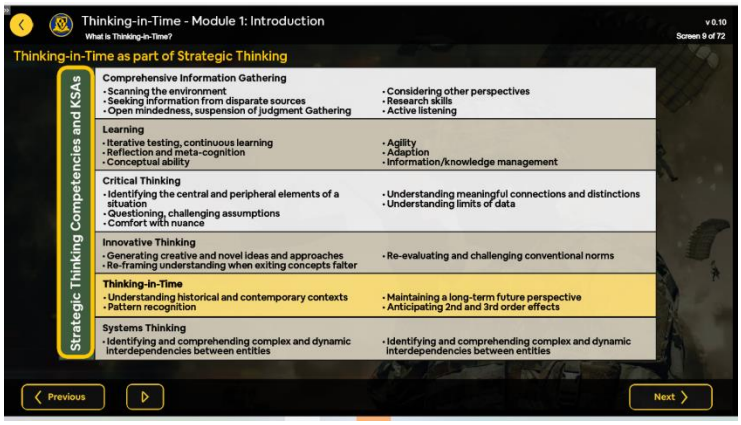
6. GNI: the new information presented to the student includes:

a. "Where did the term Thinking-in-Time come from?"



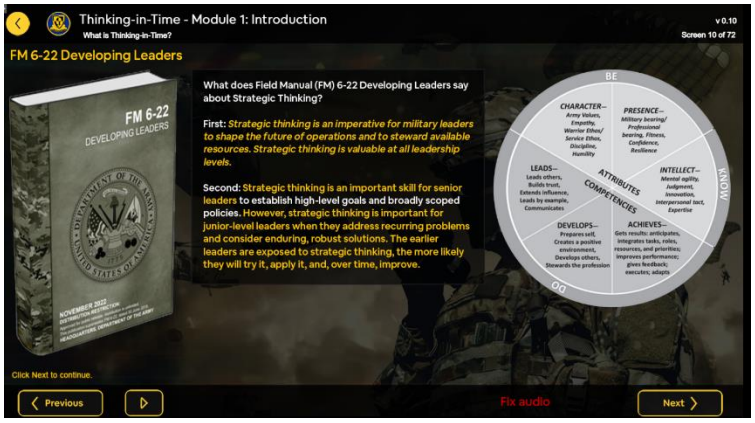
Response: You could argue it was a byproduct of America's failure to "win" the war in Vietnam. At the time it was America's longest war (1961-1975) and produced over 58,000 US dead. That tragic loss inspired a renewed interest in avoiding failure by learning from the past…Two professors—Richard Neustadt, a professor of Government at the Kennedy School and Ernest May, a professor in the Department of History at Harvard—inaugurated a program designed to train decision-makers to use history to inform contemporary policymaking. Their program avoided simplistic analogies and easy answers. It cultivated a mindset where students would craft policy in "time streams," connecting the past and present in meaningful ways in order to shape the future. They called their approach "Thinking in Time," which became the title of an influential book that summarized much of this work."

b. Thinking-in-Time as a part of Strategic Thinking. How does thinking-in-time fit in with other types of thinking? Thinking-in-Time is seen as a competency necessary to strategic thinking. The strategic thinking competencies and knowledge, skills, and abilities (KSAs) listed to the right are crucial to the ability to think effectively about complex issues. These were identified in a 2016 Army Research Institute (ARI) study titled "Enhancing the Strategic Capability of the Army: An Investigation of Strategic Thinking Tasks, Skills, and Development."

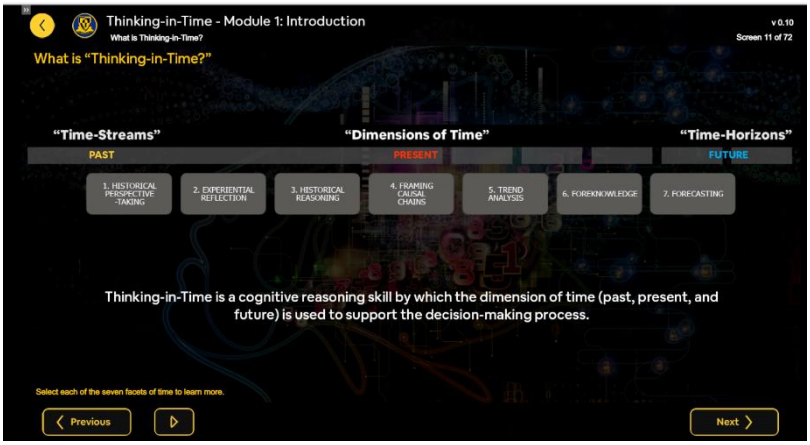


c. What does FM 6-22 say about thinking-in-time and strategic thinking?

(See slide)



d. What is Thinking-in-Time?



This diagram depicts the definition and facets of thinking-in-time. You'll notice under the timeline are the seven facets of thinking-in-time, starting with historical perspective taking, experiential reflection, historical reasoning, framing causal chains, trend analysis, foreknowledge, and finally, forecasting.

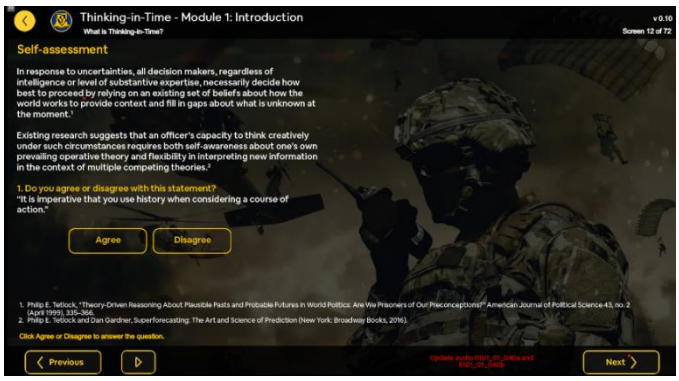
The definition is that - ***thinking-in-time is a cognitive reasoning skill by which the dimension of time, past present and future, is used to support the decision-making process***. The student can click on each facet for the definition. The definitions for the seven facets of thinking-in-time are…

- **Historical Perspective-Taking** is Understanding the actions of people, groups, or organizations within the context of their own history by taking the perspective of that person, group, or organization - including social, cultural, intellectual, and emotional factors.
- **Experiential Reflection** is Retrieving lessons learned from relevant personal experiences to identify and fill information gaps in the present situation, while acknowledging there are differences between past experiences and the present situation.
- **Historical Reasoning**. Comparing the present situation to relevant past analogous situations, mapping perceived similarities and differences from the past to the present, and making inferences about the present situation based on this mapping.
- **Framing Causal Chains** is Identifying and hypothesizing causal sequences of decisions and actions for example, chains of actions, reactions, counteractions, and outcomes, based on current information.
- **Trend Analysis** is Recognizing meaningful relationships within and between situations, hypothesizing the likely underlying patterns and trends, and critically examining assumed patterns and trends to make informed predictions about future outcomes.
- **Foreknowledge** is defined as Integrating knowledge about known or safe-to-assume futures, for example, budgeting, troop movements, terrain, and seasonal variations in weather) in the planning process.
- **Forecasting** is Envisioning multiple likely futures to achieve a desired end state, and comparing the likelihood of these futures taking place.

e. "Self-assessment and the Value of History" The student is asked three self-assessment questions.

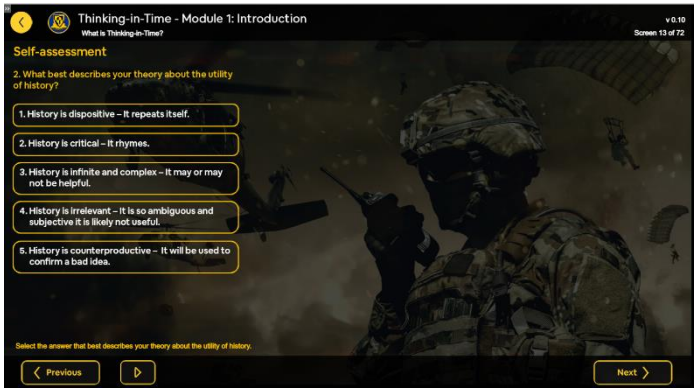
(1) It is imperative that you use history when considering a course of action. (Agree or disagree)
(2) What best describes your theory about the utility of history? (Five choices)
(3) Personal Experience gained during combat is very important to being a successful leader. (Agree or disagree)

(1) It is imperative that you use history when considering a course of action. (Agree or disagree)



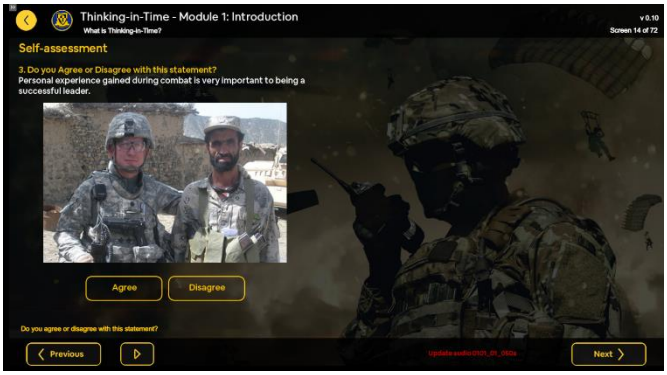
Feedback: That may be true. Obviously, history can offer many lessons and insights to a myriad of questions and situations. Conversely, the lessons of history can be misapplied or used to confirm or support invalid assumptions or approaches. Consider this *insight from the Center of Military History: Quite beyond vicarious experience of the battlefield, the study of military history affords an understanding of the interplay of forces that have shaped the present and provides the means of viewing current problems against the long perspective of how men have handled similar problems in the past. Knowledge of military history cannot produce solutions to all problems, nor can it guarantee success in a military career. But it can provide a foundation for both problem solving and career achievement.*

(2) What best describes your theory about the utility of history? (Five choices)



Feedback: "*Similar to the previous self-assessment question, the lessons of history can be misapplied or used to confirm or support invalid assumptions or approaches. Consider this analysis from Dr, Stephen Mihm: In a classic essay, the military historian Michael Howard observed that, despite all the differences from one era to the next, "wars still resemble each other more than they resemble any other human activity" This sentiment has long encouraged strategists to turn individual historical episodes into illustrations of eternal verities. When history becomes nothing more than the handmaiden of theory, though, the past becomes a blindfold. A second common perception is the idea that the past is prologue—that whatever trends can be glimpsed in the recent or more distant past necessarily point toward what will happen in the future. This reflects a particular method of understanding history that eschews complexity in favor of simple projections. In order to "think in time," you must have a nuanced view of history that recognizes contingency and complexity. Avoid developing too strong an attachment to any single theory or doctrine; this will end badly, whether you're making decisions in the present or divining the future. Be aware of the many cognitive traps that await the unwary, from sloppy analogical thinking to hindsight bias. Integrate many different sources of information into decision-making in a pragmatic, ad hoc fashion."*

(3) Personal Experience gained during combat is very important to being a successful leader. (Agree or disagree)



Feedback: C*onsider this excerpt from a 2016 Parameters article by Colonel J.P. Clarke: Combat experience is generally regarded as an unqualified good….But generations defined by war can fare poorly when faced with new conditions. Marshall's generation, for instance, was misled by experiences in the Philippines…. Veterans of the Philippines placed greater trust in their own past than in more relevant vicarious experiences. For better or worse - our personal experiences carry a disproportionate influence on our thinking.*

e. "Thinking-in-Time Big Ideas"

What the big ideas behind thinking in time are…**First**, to be an effective strategic thinker you must be able to think-in-time. You will recall that we looked at previous ARI research that determined thinking in time is one of the six competencies that comprise strategic thinking.

Second, Thinking-in-Time complements, not complicates doctrinal processes and systems. A major factor in designing a model for Thinking-in-Time is that it comports with the way emerging senior leaders are trained and educated in doctrine. By design, Doctrine helps us understand the present and think about the future.

Consider the **Third and fourth** bullets - We use the past, both learned and personal experiences, to understand the present. and when considering future actions, we use analogical reasoning, that is referencing the similarities between historical events and the present problem, whether deliberately or by default, to develop approaches. As one review put it - analogical reasoning is inescapable, operating in ways that highlight its power as one of the most fundamental, instinctive forms of human cognition. Regarding the outsized role personal experience can play, Dr. Lacquement of the Army War College stated, "there are also significant disadvantages—such as students, and sometimes faculty, anchoring on more readily available personal experiences - especially emotionally searing ones - that may inhibit the consideration of less familiar but more useful possibilities.

Looking at number **five**, as you saw from the self-assessment exercise, our views on the utility and relevance of the past will affect the type and nature of analogies we consider and the lessons we draw from them.

Sixth, the fact that Cognitive biases impede effective thinking is well documented. Awareness of these impediments and employing techniques to control them can promote better understanding.

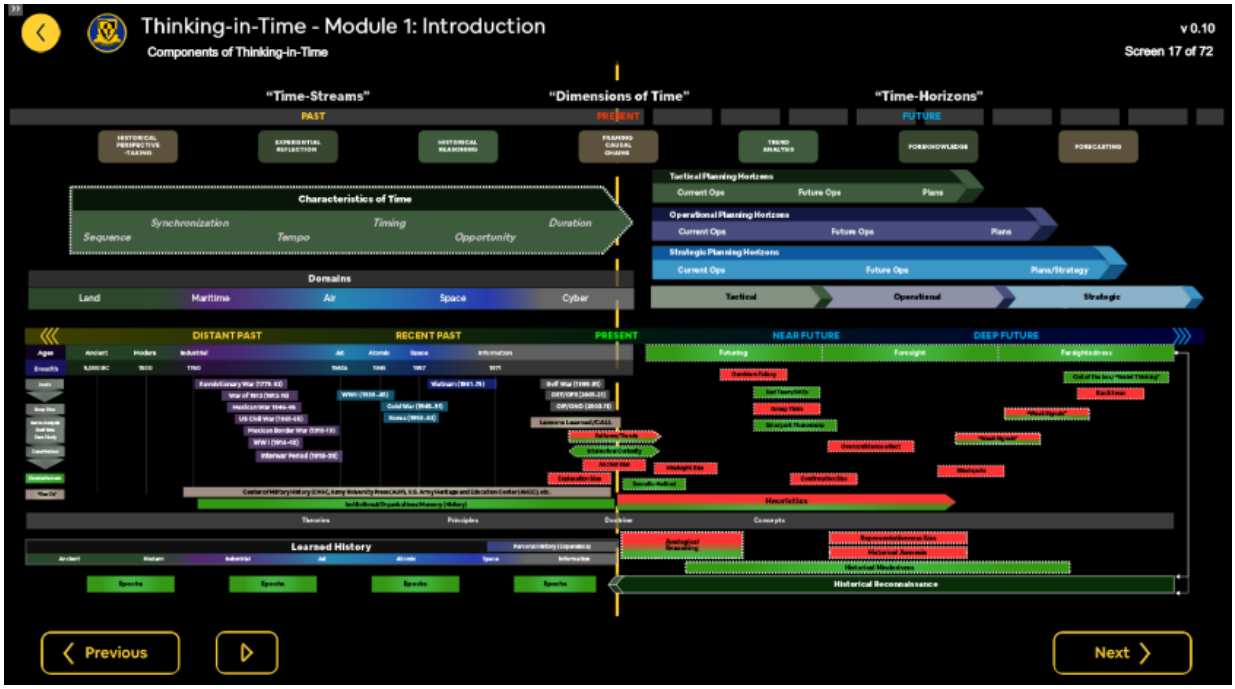
Seventh, Institutional memory/organizational history and military culture can imperceptibly influence our thinking-in and about time. Leaders need to understand and harness this force.

The **eighth** bullet, like the others is intuitively obvious - The echelon of the organization, the operational environment, and the nature of the operation(s) being executed all dictate different considerations of time as a variable. Time is a deliberate factor in both operational and mission variables or PMESII-PT(I) and METT-TC(I). You may have heard the rhetorical question, whose side is time on? Understanding the six characteristics of time can help you answer that question and more. You will also see that the answers may vary by echelon and level of war.

And **ninth**, Historical events can serve as cautionary events to be avoided or be used in scenario or plan development to anticipate and forecast the future. As an Army officer this has almost become second nature, our organizational memory has statements like no more Vietnams, or no more Task Force Smiths to drive our training and equipping strategies. Given the nature of war, the past can give us the necessary perspective for anticipating the future.

f. A Framework for Thinking-in-Time. We developed this framework to visually depict the key elements of the components of Thinking-in-Time. This model shows the major terms and concepts arrayed in relation to the dimension of time. Although the model may appear complicated at first glance, we will work through it quadrant by quadrant. (The model is available in the reference section and at Appendix A to this lesson plan, It may be useful to have a hard copy available as you go through the remainder of the course.) A quick overall orientation before we examine it in detail.

Notice the black line at the top depicting the dimension of time, past present and future. Down the center of the slide is a dotted green line indicating the present. The lower left quadrant of the framework speaks to the past – depicting various ages, for example the space age or information age. Below that you will see some of major wars the US Army has been involved in and how they correspond to the respective



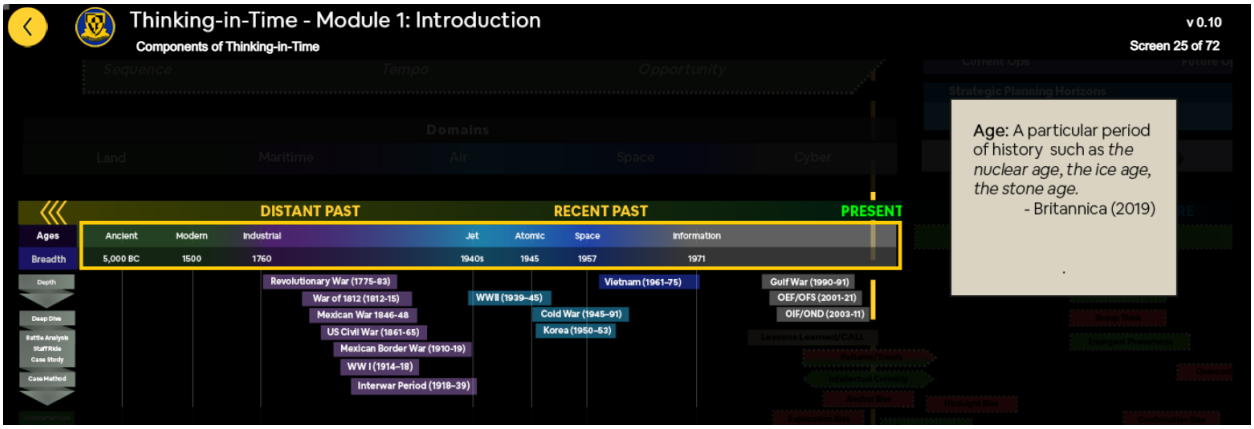
ages. To the left of the wars, you'll notice the breadth of history as well as techniques to dig deeper to plumb the depths of historical events.
Moving to the top right quadrant, or the future dimension, you notice the three levels of war and above that a depiction of the various planning horizons at each level. Looking at the lower right quadrant, to include those terms that cross the green dotted line indicating the present, you will notice numerous techniques, biases, fallacies, and other factors that influence using the past to anticipate the future. As a general rule, if they are green, they have a positive effect, if they are in red, they have a negative effect, and if they are mixed, they can have a positive or negative effect on effective thinking in time.

The narration goes on to define all of the terms, techniques, and biases. These (and more) can also be found in the Thinking-in-Time Glossary in the references section. They are listed here as described in the module (note – this is a lot of information):

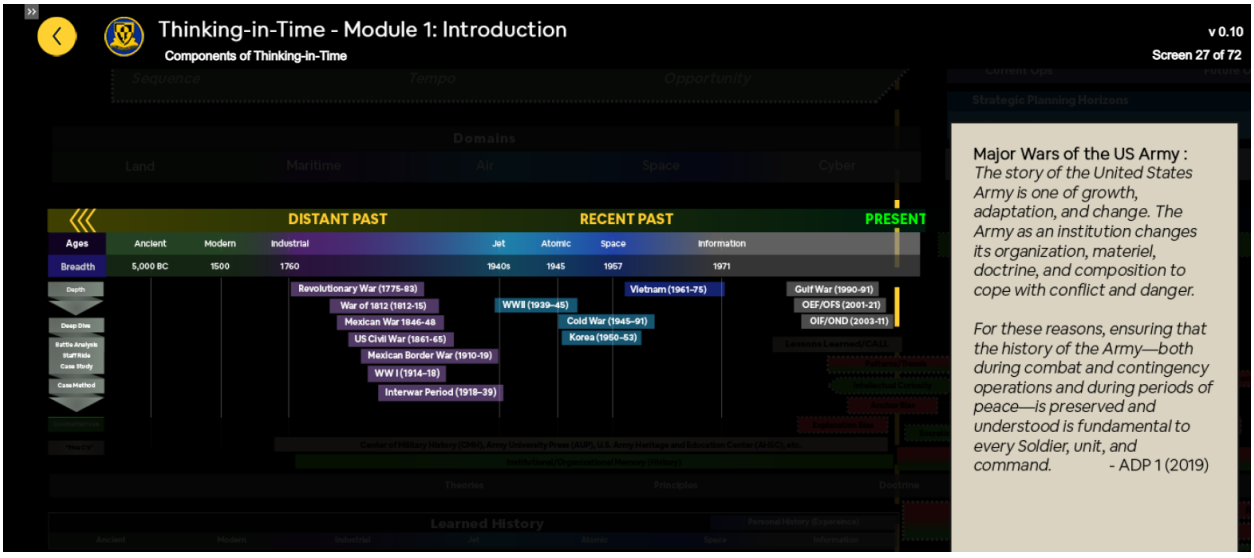
Timestreams. Looking across the top of the framework model you'll notice timestreams, it is a metaphorical conception of time as a stream, a flowing body of water. This analogy is useful in several ways: First, streams only flow one way - time move only moves forward, Second, streams flow constantly - time never stops. And finally, people in a stream will be pulled along by it. You may also recall that Neustadt and May used that term in their book thinking in time. They defined time streams as connecting the past and present and meaningful ways in order to shape the future.

The dimension of time (past, present, and future).

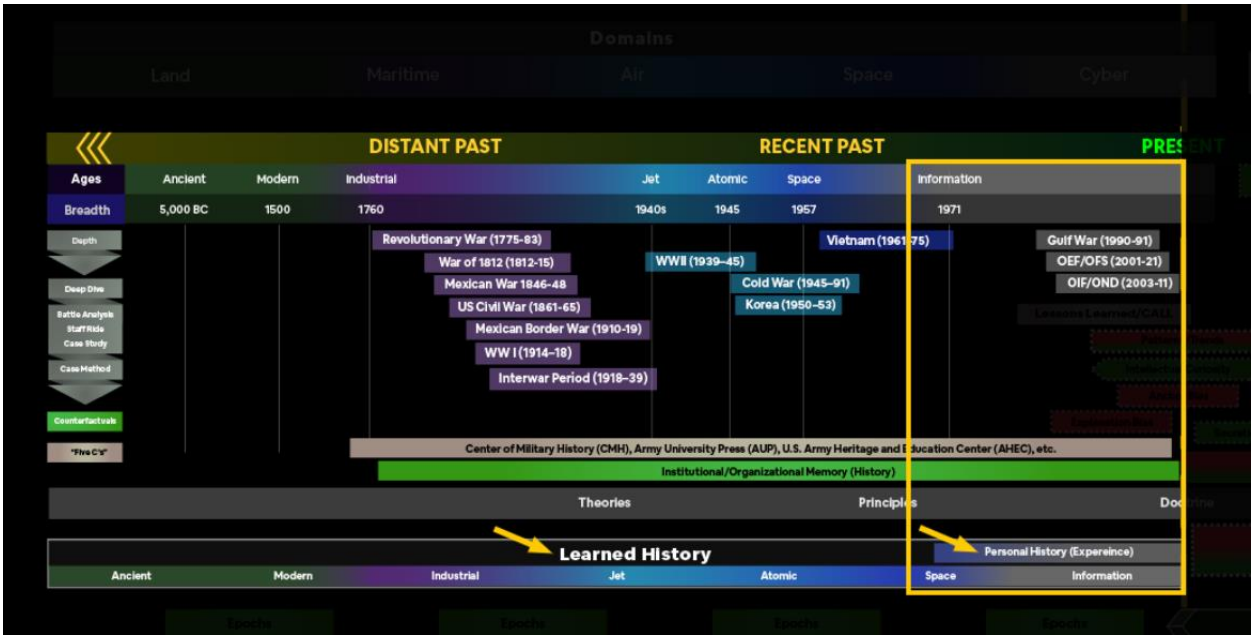
Time Horizons - also known as a planning horizon, it is a fixed point of time in the future at which point certain processes will be evaluated or assumed to end. The most common horizons used in planning.



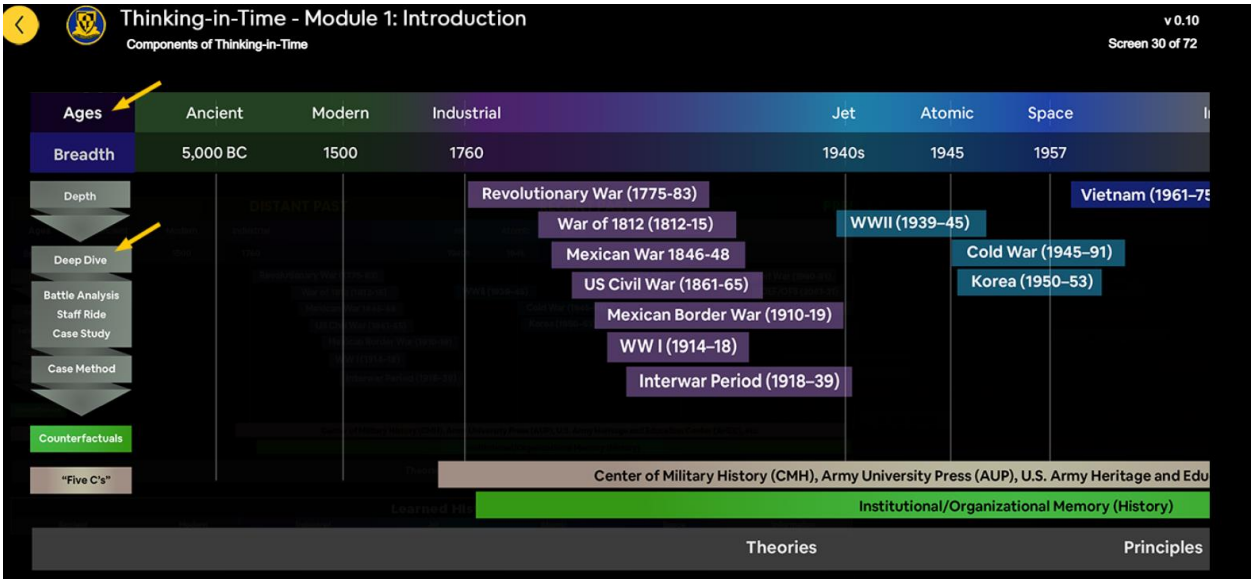
The center timeline of the model - Looking across the center timeline of the model, beginning on the left you'll notice the distant past and recent past. Below the line you'll notice the ages beginning from the left with the ancient age beginning approximately 5000 BC, to the modern age beginning in the 1500s with the industrial age beginning approximately 1760 from then on you can see the jet age atomic age space age and information age. You'll also notice the corresponding colors that flow down into the periods of major wars of the US Army. That list of wars is by no means comprehensive and again only reflects major wars with US involvement. In fact, since gaining independence, the United States used force some 280 times between 1789 and 2009. In those 280 instances, the nation only fought two wars to decisive outcomes in which entire systems of government ceased to exist and unconditional surrender was the objective. Those two are the Civil War and World War II.



As you can see from the quote on the right from ADP 1, *The Army*, it says the story of the United States army is one of growth adaptation and change. The Army as an institution changes its organization, materiel, doctrine, and composition to cope with conflict and danger. For these reasons, ensuring that the history of the Army—both during combat and contingency operations and during periods of peace—is preserved and understood is fundamental to every Soldier, unit, and command."



What you see here depicted underneath the timeline, ages, and major wars are the ideas of experience or personal history historical knowledge, and historical perspective taking. Starting with experience or personal history, you'll notice that anyone serving today has only seen service in an information age Army. Leaders are a product of their experiences. Army professionals learn from experience—both good and bad—develop good judgment and leadership and strive for continuous improvement. Experience informs intellect. Experiences form the basis of how people react to certain situations. Leaders require self-awareness if they are to accurately assess their own experience and competence as well as earn the trust of those they influence. Influences such as background, beliefs, education, and experiences affect all Soldiers and DA Civilians. Reflect on how you assessed the importance of experience earlier in this module. Historical knowledge exists in all human societies It is the cognitive appropriation of socially determined material transformations necessary for life process. Obviously, we all only possess a limited amount of historical knowledge. It can be helped by research and study, but it is a constraint for all of us. Historical perspective taking is a reasoning competency conceptualized as an understanding of the social, cultural, intellectual, and emotional setting that shaped people's lives and actions.



Techniques for diving deeper into history. On the left side underneath the timeline and ages, you see various techniques for diving deeper into history to enhance understanding.

Battle analysis The U.S. Army Command and General Staff College developed the battle analysis methodology to help its students structure their studies of battles and campaigns. The format can be easily applied by any military professional seeking insight from historical battles and campaigns to help deepen his/her understanding of warfare and the profession of arms.

Staff Ride- a historical study of a campaign or battle that envisions a systematic preliminary study phase, an extensive field study phase on the actual historic site, and an integration phase to capture the lessons derived from each. Combat Studies Institute has now created several virtual staff rides (VSR). The VSR follows the same methodology as a "live" or "field" staff ride, however the historical terrain is replicated in a virtual environment.

Case Study Method - The historical case study method is a learning technique in which the student is faced with a particular problem, the case. The case study facilitates the exploration of a real issue within a defined context, using a variety of data sources.

Case Method - is a re-enactment of a real-world strategic challenge with all the uncertainty and imperfect information that confronted the original players. Case method does not immediately reveal what actually happened, ideally eliminating hindsight bias. Case method instructors generally use the Socratic method, teaching strategy by asking questions.

Counterfactuals or Counterfactual History - is a modality of thinking or investigation that focuses on what could have been, what should have been rather than what actually happened or has been recorded or generally accepted as happening. In this sense, all counterfactuals have contrary-to-fact antecedents.

The Five Cs - are an approach to historical thinking. The concepts of change, causation, context, complexity, and contingency, together describe the shared foundations of the history discipline.

- Change is the study of history to see change over time in terms of growth, decay, and continuity. .
- Causation is the study of history to understand why an event occurred.
- Context is the study of history to interpret the past in context, but also actively create context for others.
- Complexity is the idea that you will never fully know what happened, nothing has just one cause and we do not know all causes.
- Contingency is the study of history to determine what might have happened—with aleatory events such as luck, etc. This involves using one's imagination in relation to potential causes and effects.

Army organizations that help us understand the past and military history.

The Center for Army Lessons Learned (CALL) - collects, analyzes, disseminates, identifies, and nominates issues, and archives lessons and/or best practices across all levels of war to facilitate rapid

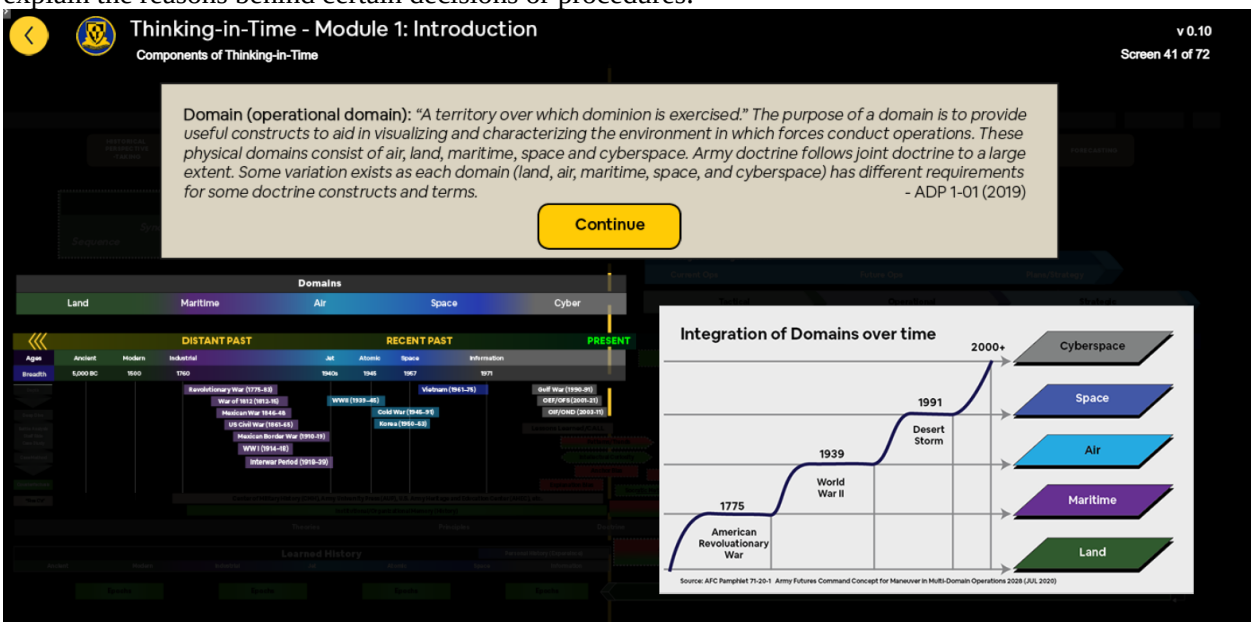
adaptation and enable operationally based decision making. CALL informs the DOTMLPF–P requirements process of new lessons and best practices to ensure they have the most current and relevant information. What would eventually become CALL began to materialize after the invasion of Grenada in 1983. The organization officially became a directorate in August 1985 under the Combined Arms Training Activity.

The Center of Military History (CMH) - is a Field Operating Agency that reports to the United States Army Training and Doctrine Command. CMH is responsible for the appropriate use of history throughout the United States Army. Since its formation, CMH has provided historical support to the Army Secretariat and Staff, contributing essential background information for decision making, staff actions, command information programs, and public statements by Army officials.

The U.S Army Heritage and Education Center - engages, inspires, and informs the Army, the American people, and global partners with a unique and enduring source of knowledge and thought. The Center is an integral part of the U.S Army War College and maintains the knowledge repositories that support scholarship and research about the U.S Army and its operating environment. The AHEC's Military History Toolbox is very useful for conducting historical reconnaissance and Thinking-in-Time. The toolbox is designed to support Soldiers and units in historically based education, professional development, and research missions.

Army University Press - is the U.S Army's premier multimedia organization that focuses on advancing the ideas and insights military professionals need to lead and succeed. Army University Press is the Army's entry point for cutting-edge thought and discussion on topics important to the Army and national defense. Through its suite of publication platforms and educational services, Army University Press makes timely and relevant information available to leaders in the military, government, and academia.

Institutional memory- A term often used interchangeably with institutional knowledge and organizational memory. Institutional memory is defined as a "collective set of experiences, lessons learned and best practices that a person or a group of people in the workplace have accumulated over time." Provides an understanding of the history and culture of an organization, especially the stories that explain the reasons behind certain decisions or procedures.



Domains - Looking at the upper left quadrant we will now discuss the idea of domains or operational domains. It is defined as a territory over which dominion is exercised. The purpose of a domain is to provide useful constructs to aid in visualizing and characterizing the environment in which forces conduct operations. These physical domains consist of air, land, maritime, space and cyberspace. Army doctrine

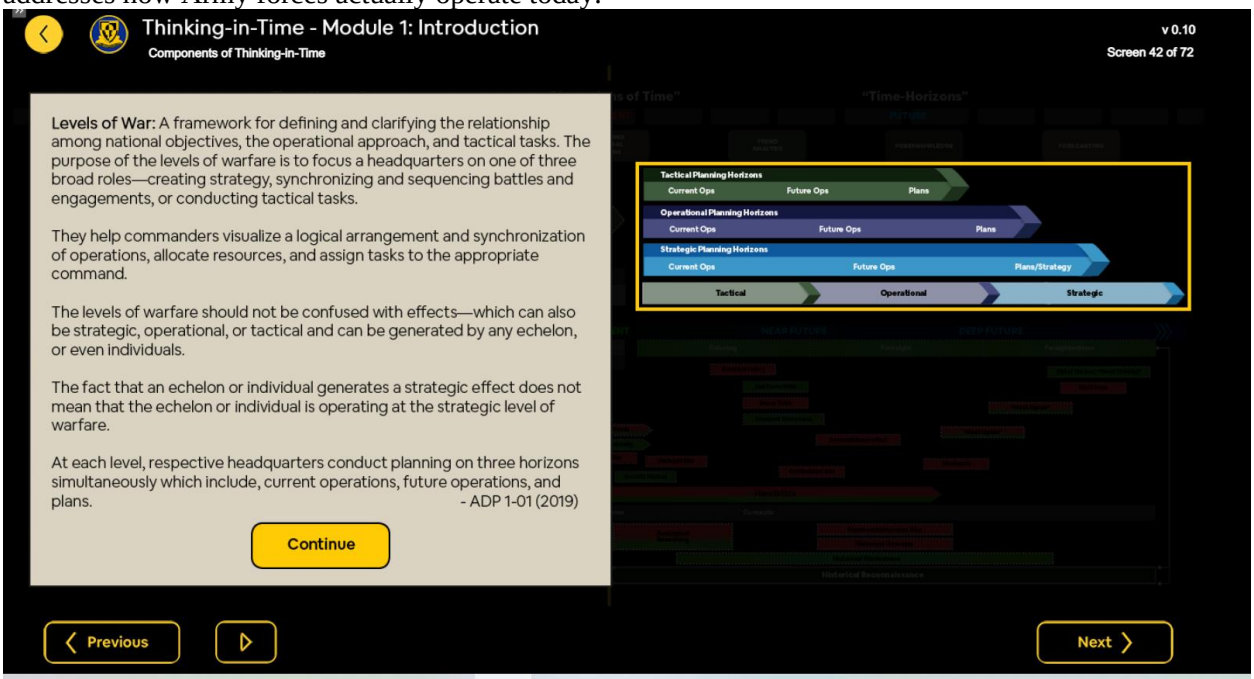
follows joint doctrine to a large extent. Some variation exists as each domain has different requirements for some doctrine constructs and terms.

If you look in the lower right corner, you'll see a diagram inset that illustrates the integration of the domains over time. If you look at the bar that depicts the five domains, starting with land and leading up to cyber you will notice they are color coded. If you look below the timeline to the ages bar you will notice that they land domain corresponds with ancient and modern history. You can see that the industrial age corresponded with the integration of the maritime domain. You can see the jet age corresponded with the air domain, the space age, and the space domain, and then finally the information age corresponds with the integration of the cyber domain.

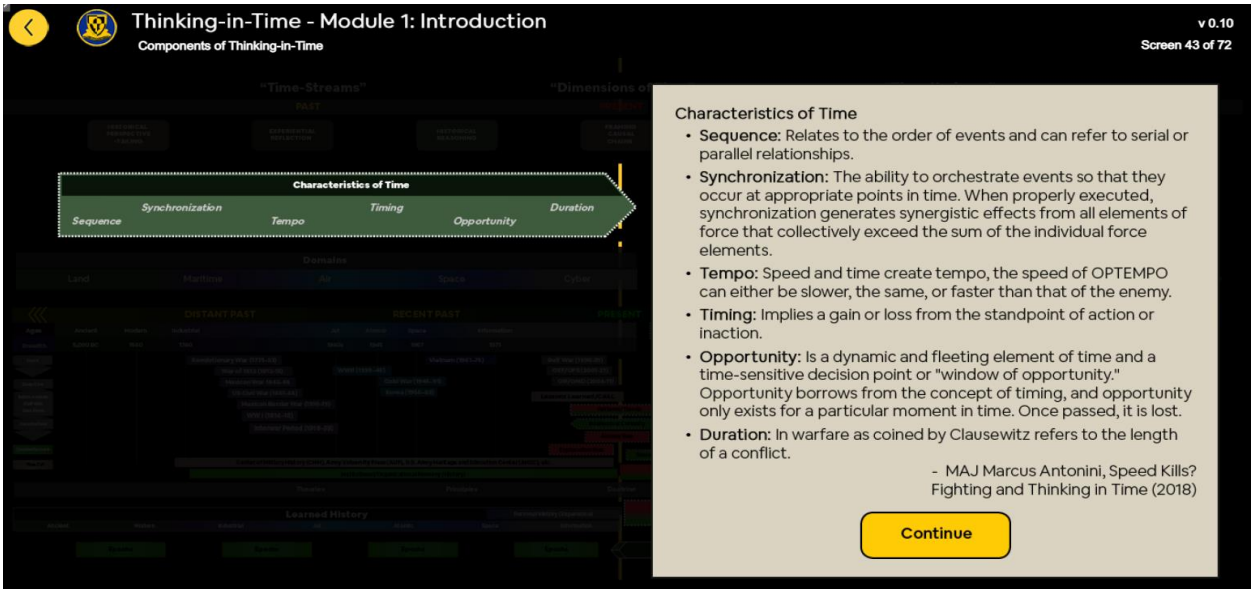
Theory, Principles, Doctrine, and Concepts.

- **Military theory** - can be described as a comprehensive analysis of all the aspects of warfare, its patterns and inner structure, and the mutual relationships of its various components/elements. It also encapsulates political, economic, and social relationships within a society and among the societies that create a conflict and lead to a war. Sound military theory explains how to conduct and win a war. It also includes the use of military force to prevent the outbreak of war.
- **Principle** - A principle is a comprehensive and fundamental rule or an assumption of central importance that guides how an organization approaches and thinks about the conduct of operations. In doctrine, principles can apply to the conduct of operations in general or apply to specific organizations or functions.
- **Doctrine** - Every profession develops a unique body of knowledge. For the Army Profession, this body of professional knowledge is doctrine. United States (U.S.) Army doctrine is about the conduct of operations by Army forces in the field (and to a limited extent the guidelines for training for operations). Doctrine is the body of professional knowledge that guides how Soldiers perform tasks related to the Army's role: the employment of landpower in a distinctly American context.

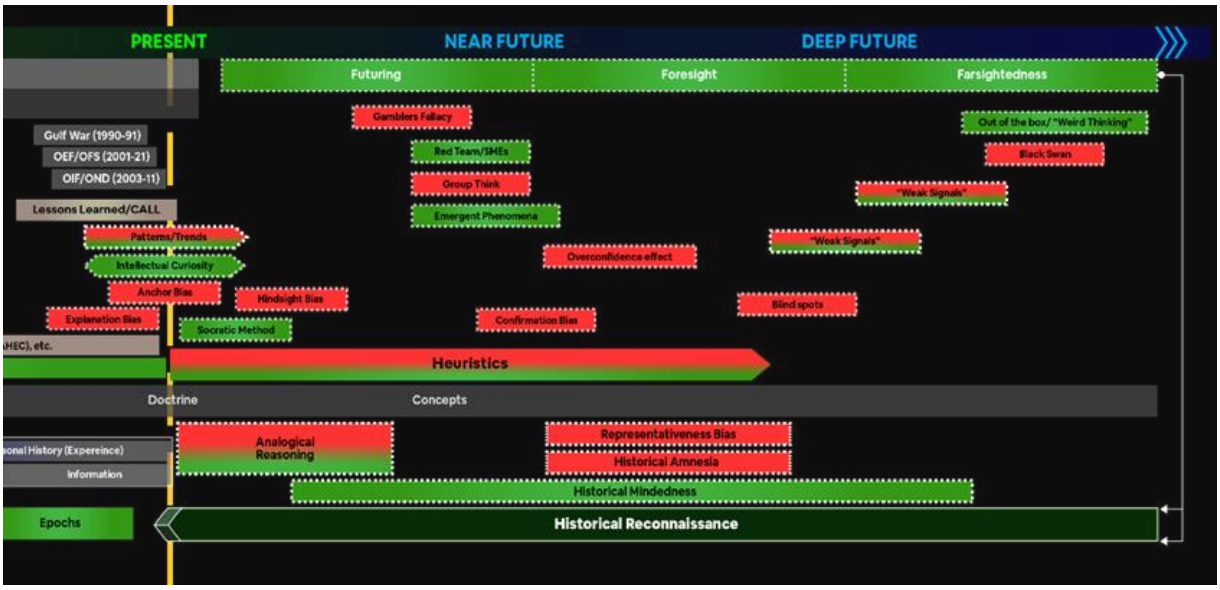
- **Concepts** - are ideas for a significant change based on proposed new approaches to the conduct of operations or technology. They become part of the Army's institutional processes for incorporating change into operations. These ideas propose significantly different methods the force might use in the future, usually 5 to 15 years hence. Leaders and Soldiers should avoid confusing concepts with doctrine. Concepts are proposals and the basis for experiments on conducting future operations whereas doctrine addresses how Army forces actually operate today.



Levels of War - Looking at the upper right quadrant you see the Levels of War - The levels of warfare are a framework for defining and clarifying the relationship among national objectives, the operational approach, and tactical tasks. The purpose of the levels of warfare is to focus a headquarters on one of three broad roles—creating strategy, synchronizing and sequencing battles and engagements, or conducting tactical tasks. They help commanders visualize a logical arrangement and synchronization of operations, allocate resources, and assign tasks to the appropriate command. The levels of warfare should not be confused with effects—which can also be strategic, operational, or tactical and can be generated by any echelon, or even individuals. The fact that an echelon or individual generates a strategic effect does not mean that the echelon or individual is operating at the strategic level of warfare. At each level, respective headquarters conduct planning on three horizons simultaneously. The three planning horizons are long-, mid-, and shortrange and are associated with the plans cell, future operations cell, and current operations integrating cell.



Characteristics of Time - Within the large green arrow in the top left quadrant are the six Characteristics of Time as described by MAJ Marcus Antonini in his thesis titled Speed Kills? Fighting and Thinking in Time. The characteristics are discussed in greater detail in module four. The complete thesis is in the references section.



The lower right quadrant:

Futuring- Futuring is the field of using a systematic process for thinking about, picturing possible outcomes, and planning for the future. Futurists are people who actively view the present world as a window on possible future outcomes. They watch trends and try to envision what might happen

Foresight - prescience, human anticipation of the course of events

Farsightedness - the ability to anticipate and plan for the future.

Pattern Recognition - is the ability to recognize and identify a complex whole composed of, or embedded in, many separate elements.

Heuristics – are mental shortcuts that can facilitate problem-solving and probability judgments. These strategies are generalizations, or rules-of-thumb, reduce cognitive load, and can be effective for making immediate judgments, however, they often result in irrational or inaccurate conclusions. Consider the availability heuristic – it exists because some memories and facts are spontaneously retrieved, whereas others take effort and reflection to be recalled. Certain memories are automatically recalled for two main reasons: they appear to happen often, or they leave a lasting imprint on our minds.

Analogical Thinking or Reasoning- is thinking characterized by extrapolations from the familiar to the unfamiliar, rather than by the use of formal logic or consecutive reasoning. It is particularly important in problem solving and learning, in which known similarities between aspects of certain entities are used to make assumptions about other aspects or entities. In its simplest terms analogical reasoning is referencing the similarities between historical events and the present problem.

Intellectual curiosity - to seek out, engage in, enjoy, and continuously pursue opportunities for effortful cognitive activity" and "understand the environment"

Socratic Method – is a process of structured inquiry and discussion between two or more people to explore the concepts and values that underlie their everyday activities and judgments.

Historical Mindedness/Awareness- is a skill set used to cast our minds backwards by helping strategist to sharpen their thinking and asking better questions to see more accurately when we look forward. Historical mindedness is agnostic to the depth of historical knowledge.

Outside the Box Thinker/Outlier opinions/Disruptors – Outside the box thinking is an ideation form where designers freely discard common problem-solving methods to find the true nature of users' problems, falsify old assumptions and be innovative.

Emergent Phenomena - an emergent phenomenon is defined as the macroscopic layers of patterns and structures that appear as a result of cooperative phenomena between autonomously behaving elements.

Weak Signals- is the first indicator of change or an arising issue that may become significant in the future. They can be used to challenge assumptions made about the future, expand future scenarios and create a more practical view of the future using examples. Identifying non-apparent future trends and challenging already identified trends. Better prepared for surprises and expanding the selection of alternate futures.

Red Team – is a function executed by trained, educated, and practiced team members that provides commanders an independent capability to fully explore alternatives in plans, operations, concepts, organizations, and capabilities in the context of the OE and from the perspectives of our partners, adversaries, and others. The Applied Critical Thinking Handbook, formally called the Red Team

Handbook, can be found at the end of this module. The explanation of cognitive biases and heuristics is from that handbook:

Cognitive biases and Heuristics: Research conducted over the past three decades indicate that people are prone to systemic errors in judgment and decision making in predictable ways.
- These errors are associated with heuristics and biases of our cognitive processes in the context of judgment and decision making. Cognitive biases result in suboptimal actions and beliefs and are generally related with intuitive thinking.
- Manifestations of these biases in intuitive thinking, are found in heuristics formally defined as, "…a simple procedure that helps find adequate, though often imperfect answers to difficult questions." In high risk, uncertain and complex environments, these imperfections are costly and warrant prevention and mitigation. This handbook has numerous mitigation techniques and methods to enhance critical thinking.

Anchoring Bias- is the tendency, in forming perceptions or making quantitative judgments under conditions of uncertainty, to give excessive weight to the starting value (or anchor), based on the first received information or one's initial judgment, and not to modify this anchor sufficiently in light of later information. Anchoring bias occurs when people over rely on the first information they come across when making decisions. For example, if you first see a pistol that costs $1,200 – then see a second one that costs $400 – you're prone to see the second gun as cheap.

How Does Anchoring Bias Affect Decision Making? Anchoring bias can benefit decision making as it can help us make reasonable estimates based on limited information. However, it can also lead to significant mistakes. When we rely too heavily on one piece of information, it restricts our ability to think logically and consider other aspects that need to be considered. For example, stock market investors may become fixated on short term fluctuations and anchor their expectations to the current price. However, a bad business will always produce bad returns in the long-run.

Explanation Bias- is the tendency of historical accounts to trace a clear causal path when contemporary forecasts would have recognized massive uncertainties. Explanation bias is related to a few familiar concepts in decision making and logic: the availability heuristic, hindsight bias, and the post hoc fallacy. As one author explained, "explanation bias is a natural proclivity that affects almost all people some of the time, and some people almost all of the time."

Hindsight Bias- is the tendency, after an event has occurred, to overestimate the extent to which the outcome could have been foreseen. For example, when presented with two opposing predictions, most people are able to justify the likelihood of either outcome -- when asked whether people prefer to spend time with others who are similar or with others who differ significantly (in beliefs, background, and the like), individuals can easily explain why either outcome is likely, often by drawing on conventional wisdom: some may claim that "birds of a feather flock together," whereas others may argue that "opposites attract." One potential problem with this way of thinking is that it can lead to overconfidence. If people mistakenly believe that they have exceptional foresight or intuition, they might become too confident and more likely to take unnecessary risks.

Gambler's Fallacy- the belief that past events can affect future probabilities. The Gambler's Fallacy can lead to suboptimal decision-making. Part of making an informed decision surrounding a future event is considering the causal relationship it has with past events. In other words, we connect events that have happened in the past to events that will happen in the future. They are seen as causes or indications of how the future will unravel. The most famous example of gambler's fallacy took place at the roulette tables of a Monte Carlo casino in 1913. For the last 10 spins of the roulette wheel, the ball had landed on black. Because the gamblers thought a red was long overdue, they started betting against black. But the ball kept on landing on black. As the trend continued, the gamblers became more and more convinced that the next turn would land on red. The crowds and wagers increased-- and so did their losses. It was

only after 26 consecutive blacks that the ball finally landed on red, and the streak came to an end. By this time, the losses were staggering, and the casino had made a fortune.

Group Think - a pattern of thought characterized by self-deception, forced manufacture of consent, and conformity to group values and ethics. William Whyte coined the term 'groupthink' in 1952, referring to the danger of what he called "rationalized conformity". It was not developed as a comprehensive explanatory theory until 1972, when American psychologist Irving Janis published his book Victims of Groupthink: A Psychological Study of Foreign Policy Decisions and Fiascoes. The failure of the Bay of Pigs invasion is regarded as an example of Group think.

Confirmation Bias: A trap that humans often fall into —we tend to look for evidence that supports the conclusion we've made prematurely, not realizing that evidence can often support several hypotheses. "No matter what we humans think about, we tend to pay more attention to stuff that fits in with our beliefs than stuff that might challenge them…"

Consider the recent example of confirmation bias cited by the US Airforce that lead to the death of 10 innocent civilians as reported in Air Force Magazine. Three days after 13 Americans were killed at Hamid Karzai International Airport in Kabul, a U.S. Central Command strike cell in Qatar made a series of assumptions over the course of eight hours based on the intelligence available at the time, leading to the death of 10 innocent civilians, including seven children, according to the final report by the Air Force inspector general, Lt. Gen. Sami D. Said.

"Individuals involved in this strike that were interviewed during this investigation, truly believed at the time that they were targeting an imminent threat to U.S. forces on HKIA." The inspector general said confirmation bias then crept in, making analysts believe Ahmadi was acting suspiciously. A stop at a suspected ISIS location and handover of a computer bag was one example, since a computer bag was used in the Aug. 26 HKIA attack. So, the fact that on that day, on the 29th we're watching this white Corolla, we saw an exchange of a computer bag. It wasn't lost on people," Despite the execution errors combined with confirmation bias that led to the "regrettable strike" and civilian casualties, Said said the investigation "found no violation of law." The results of Confirmation Bias can be deadly.

The Overconfidence Effect is a cognitive bias characterized by an overestimation of one's actual ability to perform a task successfully, by a belief that one's performance is better than that of others, or by excessive certainty in the accuracy of one's beliefs. For leaders, one of the most precarious traps is the "overconfidence effect" where self-confidence outstrips ability. For example, consider a 1981 study in which 93% of US drivers said that they were 'above average'. This is of course an objective impossibility, as by definition 50% of any large group of people should be above average. Yet, as the study showed, at least half of us tend to overestimate our abilities in that area—leaders are no different, and this can have severe consequences.

Representativeness bias is sloppy analogical thinking where and when facing a new situation, most people will try to fit it into categories derived from existing experience even when the facts do not warrant such comparisons. In financial markets, one example of this representative bias is when investors automatically assume that good companies make good investments. However, that is not necessarily the case. A company may be excellent at their own business, but a poor judge of other businesses. Another example is that of analysts forecasting future results based on historical performance. Just because a company has seen high growth for the past five years doesn't necessarily mean that trend will continue indefinitely into the future.

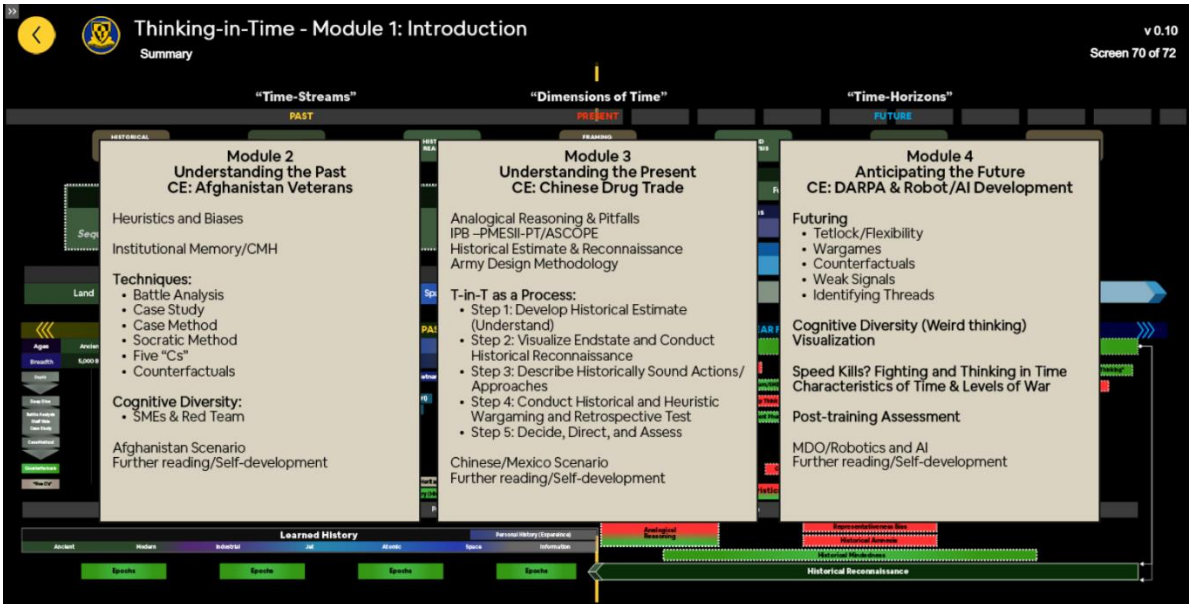
Historical Amnesia – is the selective overlooking or ignoring of events or acts that are not favorable or useful to one's purpose or position.

Black Swan- is something that cannot be predicted - The seemingly improbable but highly consequential surprises that turn our familiar ways of thinking upside down. According to one investment company there have been a number of Black Swan events throughout history – they argue that both World Wars, the fall of the Soviet Union, the rise of Islamic fundamentalists, 9/11, the impact of the spread of the Internet, and the 1987 and 2008 financial crises are all examples of Black Swan events.

Blind spots- are a lack of insight or awareness—often persistent—about a specific area of one's behavior or personality. There is also an argument that groups can have blind spots as well.

Historical Reconnaissance – is a term (metaphor) coined to support Thinking-in-Time for the emerging senior leader. As the doctrinal definition for reconnaissance suggests, "A mission undertaken to obtain, by visual observation or other detection methods, information about the activities and resources of an enemy or adversary, or to secure data concerning the meteorological, hydrographic, or geographic characteristics of a particular area. Also called RECON. (JP 2-0) Historical reconnaissance is looking backwards to secure data useful to Thinking-in-Time.

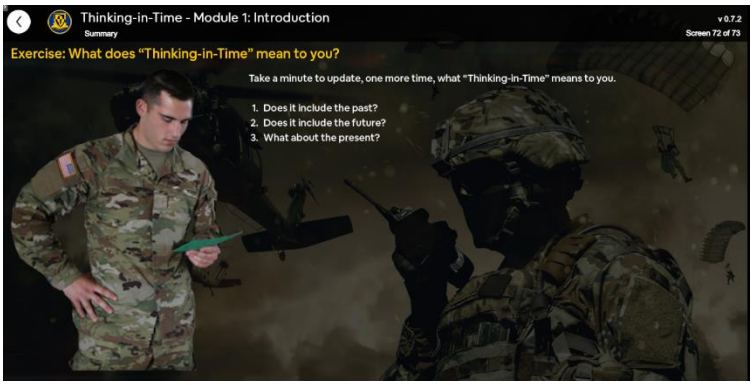
Summary – The Importance of Thinking-in-Time. This brief video has a great summation by LTG H. R. McMaster.



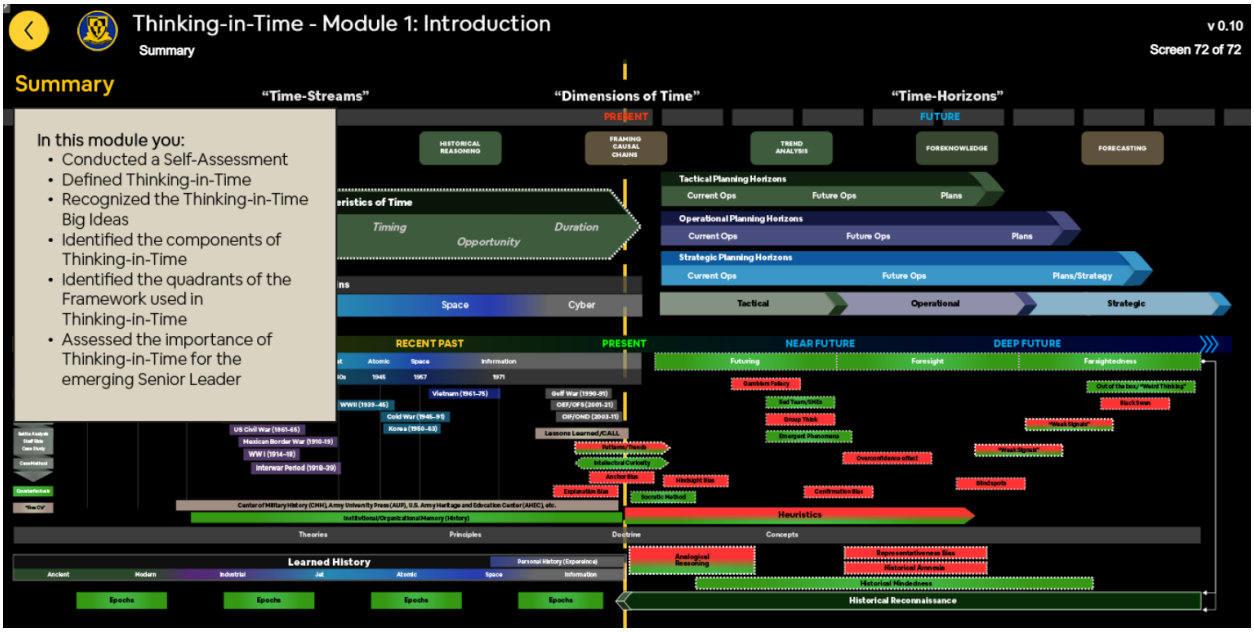
As mentioned previously, we developed this framework to visually depict the major terms and concepts arrayed in relation to the dimension of time. In general, module 2 will focus on the left side of the model, module 3- the center, and module 4 the right side.

7. Develop/Apply:

Now that we have briefly discussed Thinking-in-Time, how would you define that term now?
Take a minute to think about it.



Module Summary



In this module the student:

- **Conducted a self-assessment** of your attitudes regarding the value and utility of history and personal experience.
- **Defined thinking in time** - and that thinking in time is related to strategic thinking.
- **Recognized the big ideas behind thinking in time,** including the components and elements that make up thinking in time.
- **Identified the components of thinking-in-time and the quadrants of the framework**, and you saw how those elements are related to the past, present, and future.
- **Viewed the LTG McMaster Video**. Assessed the importance of Thinking-in-time for emerging senior leaders.

The key takeaway from module 1, is the understanding of the lexicon to facilitate thinking in time which will be applied in the remaining modules. While module 1 has a lot of new terms, they are terms necessary to think strategically and make better decisions.

Appendix A: Possible Discussion Questions

1. What do you think about a lesson about Thinking-in-Time?

2. President Eisenhower in JAN 1958 described the need to take action today to be ready for the future. Are we as a nation taking action today to be ready for the future? What are the implications for the Army?

3. What does "Thinking-in-Time" mean to you?

4. We asked numerous general officers, senior executive service members, historians, professors, and strategists that same question. Which definition resonated with you the most?"

5. Where did the term Thinking-in-Time come from?

6. How does thinking-in-time fit in with other types of thinking? A: It's a competency necessary to strategic thinking. (ARI).

7. What is the right time in an officer's career to learn about thinking-in-time and strategic thinking?

8. What is Thinking-in-Time? A: *Thinking-in-time is a cognitive reasoning skill by which the dimension of time, past present and future, is used to support the decision-making process.*

9. Can you give an example where you used *Thinking-in-time to inform a course of action or decision?*

10. Do you believe it is imperative that you use history when considering a course of action?

11. What best describes your theory about the **utility of history**? (Five choices)

12. Do you think that **Personal Experience** gained during combat is very important to being a successful leader?

13. Can you give an example where **personal experience** misinformed you about a situation?

14. How might twenty years of COIN impact our approach to LSCO?

15. **What dimension of time (past, present, and future) is the most important?**

16. Why do you think the United States only fought two wars (Civil War and WWII) to **decisive outcomes** unconditional surrender was the objective?

17. Why is ensuring that **the history of the Army**—both during combat and contingency operations and during periods of peace—is preserved and understood is fundamental to every Soldier, unit, and command?

18. Leaders are a product of their **experiences**. How can you assess your own experience and competence?

19. We all only possess a limited amount of **historical knowledge**. What are you doing to enhance your historical knowledge?

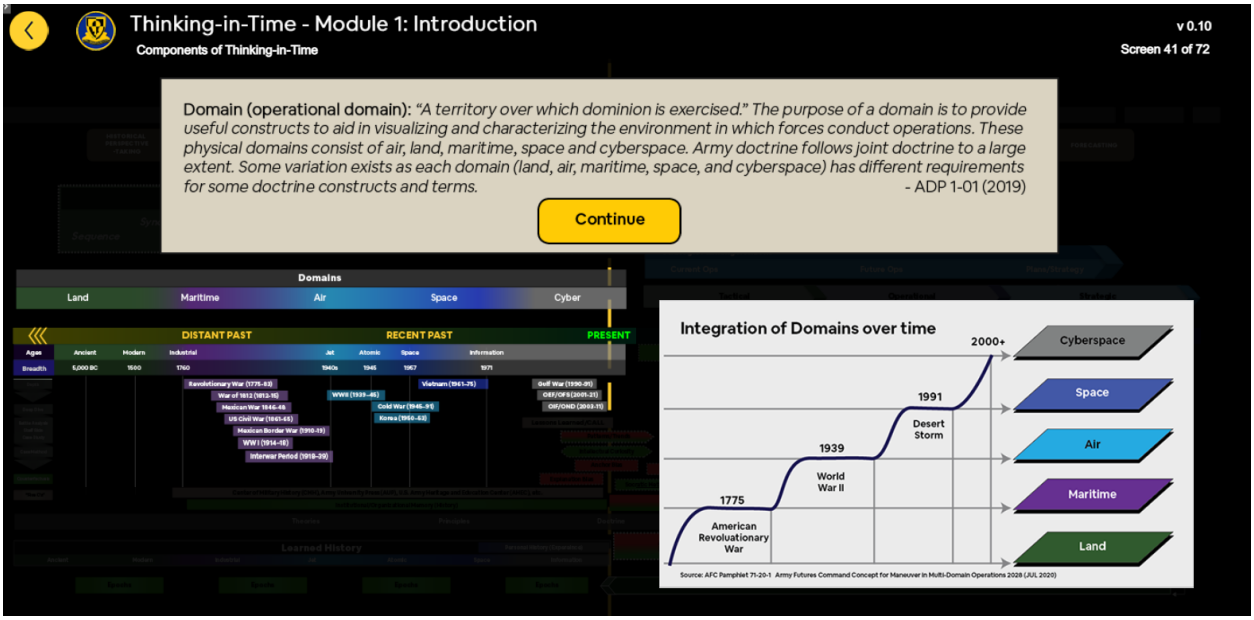
20. What are the advantages and disadvantages to the various **techniques for diving deeper into history** (**Battle analysis**, **Staff Ride, Case Study Method, Case Method, and Counterfactuals or Counterfactual History)?**

21. **The Five Cs** - are an approach to historical thinking (change, causation, context, complexity, and contingency).
    - Which is the most important?

22. Why is understanding **organizational/institutional memory** important?

23. The purpose of a **domain** is to provide useful constructs to aid in visualizing and characterizing the environment in which forces conduct operations. These physical domains consist of air, land, maritime, space and cyberspace. You can see that the industrial age corresponded with the integration of the maritime domain. You can see the jet age corresponded with the air domain, the space age, and the space domain, and then finally the information age corresponds with the integration of the cyber domain.

    - What is the next **domain** likely to be?



24. Which one is the most important**, Theory, Principles, Doctrine, or Concepts?**

25. Which **level of warfare** (strategic, operational, or tactical) is most important?

26. How might the **Characteristics of Time (Sequence, Synchronization, Tempo, Timing, Opportunity, and Duration)** differ at the various levels of war?

27. **Heuristics** – are mental shortcuts that can facilitate problem-solving and probability judgments.
    - Why do you need to be aware of this?

28. **Analogical Thinking** or Reasoning- is thinking characterized by extrapolations from the familiar to the unfamiliar, rather than using formal logic or consecutive reasoning.
    - Why do you need to be aware of this type of thinking/reasoning?

29. **Intellectual curiosity** - to seek out, engage in, enjoy, and continuously pursue opportunities for effortful cognitive activity" and "understand the environment."
    - What can you do to cultivate this trait?

30. **Socratic Method** – Why is asking questions an important activity? (Oh, the irony)

31. **Historical Mindedness/Awareness**- is a skill set used to cast our minds backwards by helping strategist to sharpen their thinking and asking better questions to see more accurately when we look forward.
    - What can you do to cultivate this trait?

32. **Outside the Box Thinker/Outlier opinions/Disruptors** – Outside the box thinking is an ideation form where designers freely discard common problem-solving methods to find the true nature of users' problems, falsify old assumptions and be innovative.
    - How do leaders cultivate this trait in subordinates?
    - What are the pros and cons of this type of thinking?

33. **Emergent Phenomena -** an emergent phenomenon is defined as the macroscopic layers of patterns and structures that appear as a result of cooperative phenomena between autonomously behaving elements.

    - Can someone provide an example? A: Possible example - Covid > Closes schools > ASVAB Test scores drop > Recruiting falls short > Army starts Future Soldier Preparatory Course

34. **Weak Signals-** is the first indicator of change or an arising issue that may become significant in the future.
    - Can someone provide an example?
    - Whose job is it to look for them?

35. **Red Team** – is a function that provides an independent capability to fully explore alternatives in plans, operations, concepts, organizations, and capabilities in the context of the OE and from the perspectives of our partners, adversaries, and others.

    - How do leaders cultivate this trait in subordinates?
    - What are the pros and cons of this approach?

36. **Anchoring Bias-** is the tendency, in forming perceptions or making quantitative judgments under conditions of uncertainty, to give excessive weight to the starting value (or anchor), based on the first received information or one's initial judgment, and not to modify this anchor sufficiently in light of later information.
    - Can someone provide an example?
    - How Does Anchoring Bias Affect Decision Making?

37. **Explanation Bias**- is the tendency of historical accounts to trace a clear causal path when contemporary forecasts would have recognized massive uncertainties. As one author explained, "explanation bias is a natural proclivity that affects almost all people some of the time, and some people almost all of the time." Can someone provide an example?

38. **Hindsight Bias**- is the tendency, after an event has occurred, to overestimate the extent to which the outcome could have been foreseen.
    - Can someone provide an example?

39. **Gambler's Fallacy**- the belief that past events can affect future probabilities.
    - Can someone provide an example?

40. **Group Think -** a pattern of thought characterized by self-deception, forced manufacture of consent, and conformity to group values and ethics.
    - Can someone provide an example?

41. **Confirmation Bias**: A trap that humans often fall into —we tend to look for evidence that supports the conclusion we've made prematurely, not realizing that evidence can often support several hypotheses.
    - Can someone provide an example?

42. **The Overconfidence Effect** is a cognitive bias characterized by an overestimation of one's actual ability to perform a task successfully, by a belief that one's performance is better than that of others, or by excessive certainty in the accuracy of one's beliefs.
    - Can someone provide an example?

43. **Representativeness bias** is sloppy analogical thinking where and when facing a new situation, most people will try to fit it into categories derived from existing experience even when the facts do not warrant such comparisons.
    - Can someone provide an example?

44. **Historical Amnesia** – is the selective overlooking or ignoring of events or acts that are not favorable or useful to one's purpose or position.
    - Can someone provide an example?

45. **Black Swan**- is something that cannot be predicted - The seemingly improbable but highly consequential surprises that turn our familiar ways of thinking upside down.
    - Can someone provide an example?

46. **Blind spots-** are a lack of insight or awareness—often persistent—about a specific area of one's behavior or personality.
    - Can someone provide an example? .

47. **Historical Reconnaissance** – is a term (metaphor) coined to support Thinking-in-Time for the emerging senior leader. Historical reconnaissance is looking backwards to secure data useful to Thinking-in-Time.
    - Can someone provide an example of when they have done this?

48. **The Importance of Thinking-in-Time.** (LTG H. R. McMaster). What was the most useful/important thing he said?

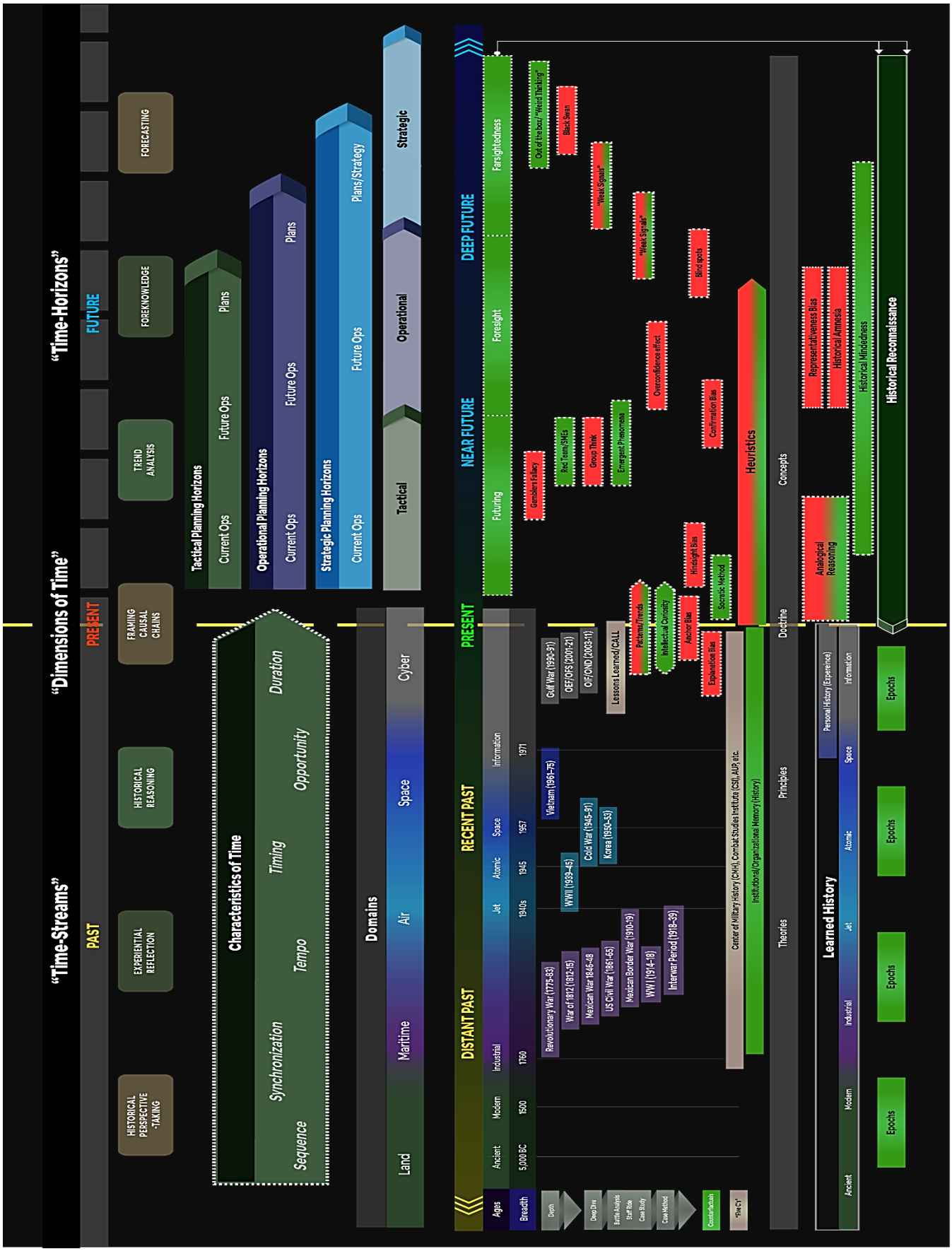
49. **Develop/Apply:** Now that we have discussed Thinking-in-Time, how would you define that term now?

50. What is the most important concept to take away from this module?

51. How can you apply what you've learned in the remainder of this course?

52. How can you apply what you've learned when you get to your next unit?

Appendix B: Thinking-in-Time Framework


"Time-Streams"
"Dimensions of Time"
"Time-Horizons"
PAST
PRESENT
FUTURE
HISTORICAL PERSPECTIVE -TAKING
EXPERIENTIAL REFLECTION
HISTORICAL REASONING
FRAMING CAUSAL CHAINS
TREND ANALYSIS
FOREKNOWLEDGE
FORECASTING
Characteristics of Time
Sequence
Synchronization
Tempo
Timing
Opportunity
Duration
Domains
Land
Maritime
Air
Space
Cyber
Tactical Planning Horizons
Current Ops
Future Ops
Plans
Operational Planning Horizons
Current Ops
Future Ops
Plans
Strategic Planning Horizons
Current Ops
Future Ops
Plans/Strategy
Tactical
Operational
Strategic
DISTANT PAST
RECENT PAST
PRESENT
NEAR FUTURE
DEEP FUTURE
Ages
Breadth
Depth
Deep Dive
Battle Analysis
Staff Ride
Case Study
Case Method
Counterfactuals
"Pink Cr"
Ancient
Modern
Industrial
Jet
Atomic
Space
Information
5,000 BC
1500
1760
1940s
1945
1957
1971
Revolutionary War (1775-83)
War of 1812 (1812-15)
Mexican War 1846-48
US Civil War (1861-65)
Mexican Border War (1910-19)
WWI (1914-18)
Interwar Period (1918-39)
WWII (1939-45)
Cold War (1945-91)
Korea (1950-53)
Vietnam (1961-75)
Gulf War (1990-91)
OEF/OFS (2001-21)
OIF/OND (2003-11)
Lessons Learned/CALL
Center of Military History (CMH), Combat Studies Institute (CSI), AUP, etc.
Institutional/Organizational Memory (History)
Theories
Principles
Doctrine
Concepts
Learned History
Personal History (Experience)
Information
Epochs
Epochs
Epochs
Epochs
Patterns/Trends
Intellectual Curiosity
Anchor Bias
Explanation Bias
Hindsight Bias
Socratic Method
Heuristics
Analogical Reasoning
Gamblers Fallacy
Red Team/SMEs
Group Think
Emergent Phenomena
Overconfidence effect
Confirmation Bias
Blind spots
Representativeness Bias
Historical Amnesia
Historical Mindedness
Historical Reconnaissance
Foresight
Futuring
Foresightedness
Out of the box/ "Hybrid Thinking"
Black Swan
"Weak Signals"
"Weak Signals"