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Foreword

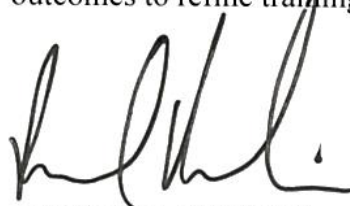
From the Commanding General U.S. Army Training and Doctrine Command

The Army is a learning organization. Therefore, the Army's vision is to immerse Soldiers and Army civilians in a progressive, continuous, learner-centric, competency-based learning environment from their first day of service. Within this environment, the Army applies a comprehensive program combining training, education, and experience to develop agile, adaptive, and innovative Soldiers, Army Civilians, and teams able to fight against capable and elusive enemies and win in a complex world. The Army intends to focus on the learner to strengthen and develop competencies that enable leaders to build trusted, cohesive teams capable of winning in all environments and across all domains. The learning environment will consist of tough and realistic conditions and include joint, interorganizational, and multinational components to prepare leaders for 2025 and beyond.

Building on the enduring foundation of more than 24- years of preparation to defend the Nation, the Army looks to the future through its concept development process. The documents within the Army Concept Framework describe fundamental ideas about future Army operations and key required capabilities. United States (U.S.) Army Training and Doctrine Command (TRADOC) Pamphlet (TP) 525-8-2, *The U.S. Army Learning Concept for Training and Education 2020-2040* (ALC-TE) is a leadership-directed concept that outlines the key characteristics and elements required to build the future Army learning environment.

The ALC-TE combines thoughts from both TP 525-8-2 (Army learning concept) and TP 525-8-3 (Army training concept) into one document that supersedes both. The ALC-TE provides the Army visualization of the future learning environment. It describes a continuous, adaptive learning enterprise that facilitates a career-long continuum of learning. The ALC-TE creates the conditions necessary for the Army to develop trained and capable Soldiers and Army civilians with the knowledge and skills needed to generate and sustain trained teams that improve and thrive under conditions of ambiguity and chaos.

This concept focuses the Army's efforts to enhance learning in Army classrooms, in the field, and through self-development. Future Army training and education will help Army leaders *think* clearly about future armed conflict across the human dimension, *learn* about the future by optimizing leader development, *analyze* learning outcomes, *gaining* intellectual and cognitive advantages over future adversaries, and *implement* outcomes to refine training and education.



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Military Operations

THE U.S. ARMY LEARNING CONCEPT FOR TRAINING AND EDUCATION
2020-2040

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History. This major revision consolidates U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (TP) 525-8-2, *United States Army TRADOC's Army Learning Concept*, change 1, and TP 525-8-3, *Army Training Concept*, into a single concept, TP 525-8-2, *the U.S. Army Learning Concept for Training and Education, 2020-2040*. Because this publication is revised extensively, not all changed portions have been highlighted in the summary of change.

Summary. TP 525-8-2 describes a future Army learning environment that meets the need to develop adaptable, thinking Soldiers and Army civilians with the learning competencies to generate and sustain trained teams. The concept focuses on individual learning to enable individualized and career-long learning that is integrated seamlessly with unit training capabilities to support the conduct of joint combined arms operations.

Applicability. This concept applies to all Department of the Army (DA) activities that develop doctrine, organizations, training, materiel, leadership and education, personnel, facilities and policy (DOTMLPF-P) capabilities. This concept informs subsequent supporting concepts and the Joint Capabilities Integration and Development System process. It supports Army capabilities development processes described in TRADOC Regulation 71-20 and functions as a conceptual basis for developing concepts related to the future force within DOTMLPF-P. It also supports Army training and leader development described in Army Regulation 350-1.

This document supersedes TP 525-8-2, dated 20 January 2011, TP 525-8-2 Change 1, dated 11 June 2011, and TP 525-8-3, dated 7 January 2011.

Proponent and supplementation authority. The proponent of this pamphlet is the Director, Army Capabilities Integration Center (ARCIC). The proponent has the authority to approve exceptions or waivers to this pamphlet that are consistent with controlling law and regulations. Do not supplement this pamphlet without prior approval from Director, ARCIC, attention Joint and Army Concepts Division (ATFC-ED), 950 Jefferson Avenue, Ft. Eustis, VA 23604-5763.

Suggested improvements. Users are invited to submit comments and suggested improvements using DA Form 2028 (Recommended Changes to Publications and Blank Forms) to Director, ARCIC (ATFC-ED), 950 Jefferson Avenue, Fort Eustis, VA 23604-5763 with a copy provided to Provost, Army University, 201 Auger Avenue, Fort Leavenworth, KS 66027.

Availability. This publication is approved for public distribution and is available on the TRADOC homepage at <http://www.tradoc.army.mil/tpubs/pamndx.htm>

Summary of Change

TRADOC Pamphlet 525-8-2

The U.S. Army Learning Concept for Training and Education

This revision, dated 13 April 2017-

- o Integrates United States Army Training and Doctrine Command Pamphlets 525-8-2, its Change 1, and 525-8-3 into one concept.
- o Standardizes concept timeframes to 2020-2040.
- o Revises the Foreword.
- o Updates title (title changed throughout), introduction (chap 1), conclusion (chap 4).
- o Updates assumptions (para 1-8).
- o Replaces conceptual foundation with the operational context (chap 2) and meeting the challenges with the military problem and components of the solutions (chap 3).
- o Describes how Army forces conduct learning as part of globally integrated operations consistent with the *Capstone Concept for Joint Operations: Joint Force 2020*, United States Army Training and Doctrine Command Pamphlet 525-3-0, *The U.S. Army Capstone Concept*, United States Army Training and Doctrine Command Pamphlet 525-3-1, *The U.S. Army Operating Concept: Win in a Complex World*, and The Army Human Dimension Strategy 2015 (throughout).
- o Updates references (app A).
- o Re-letters required capabilities appendix. Updates required capabilities and describes how the Army will develop the learning (app B).

- o Adds appendix that identifies how Army training and education-related science and technology will support implementation of the concept (app C).
- o Adds appendix that identifies risks associated with adopting this concept and ways to mitigate risks (app D).
- o Deletes appendices addressing proposed Army Learning Concept 2015 actions, 21st century Soldier competencies, current United States Army Training and Doctrine Command learning environment, and career span implications.

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Chapter 1 Introduction

1-1. Purpose

a. U.S. Army Training and Doctrine Command (TRADOC) Pamphlet (TP) 525-8-2, *The U.S. Army Learning Concept for Training and Education (ALC-TE)*, describes a systematic approach to future learning. This approach delivers an adaptive blend of learner-centric training and education which combines with experience to enable development of mission-capable Soldiers, Army civilians, and cohesive teams to win in a complex world.¹ The concept is intended for all leaders in the Army (uniformed and civilian) who make learning decisions.

b. The *ALC-TE* provides a common intellectual framework to support training and education of future Army forces. It serves as a foundation for the development of learning strategies, programs, and processes. With this guidance, the Army will hone its core competencies in the classroom, at home station, at the combat training centers, when deployed, and through structured and non-structured self-development. Learners commit to continuous career-long learning to become adaptable, agile, innovative Soldiers and Army civilians and use collective training events to train adaptable and combat ready combined arms teams.

c. This pamphlet consolidates, integrates, and supersedes TP 525-8-2, *The U.S. Army Learning Concept for 2015*, and TP 525-8-3, *The U.S. Army Training Concept 2012-2020*. The *ALC-TE* synchronizes the timeframes and provides a common timeframe to achieve the vision of the Army's force in the near- (2016-2020), mid- (2020-2030), and far- (2030-2040) terms. This synchronization permits resource allocation to facilitate planning, programming, and budgeting. Senior Army leaders identify the near-, mid-, and far terms as times of preparing for war as much as participating in active campaigns.

d. This concept is consistent with the *Army Leader Development Strategy*, Field Manual 6-22, *Army Leader Development*, and Army Doctrine Publication (ADP) 7-0, *Training Units and Developing Leaders*, which describe a continuous, career-long process that aligns training, education, and experience to prepare leaders.²

1-2. References

Appendix A lists required and related publications.

1-3. Explanation of abbreviations and terms

The glossary explains abbreviations and special terms used in this pamphlet.

1-4. Linkage to TRADOC Pamphlet (TP) 525-3-0

TP 525-3-0, *the U.S. Army Capstone Concept (ACC)*, states that training, education, and experiences develop the learning culture and requisite attributes, knowledge, competencies, and skills necessary to operate effectively and ethically under conditions of uncertainty and complexity. The ACC serves as the foundation for individual and collective training concepts that foster adaptability, agility, initiative, innovation and confidence. The ideas in the *ALC-TE* adjust

to support training and education of Soldiers and Army civilians as missions, the mix of traditional and non-traditional threats, and the envisioned changes to the operational environment.

1-5. Linkage to TP 525-3-1

a. The ALC-TE links to TP 525-3-1, the *U.S. Army Operating Concept: Win in a Complex World 2020-2040* (AOC), through sustained collaboration and learning across the Army, striking the right balance between current readiness and investment in future capabilities.³ Army professionals must be committed to reading, thinking, and learning about future armed conflict, and determining what capabilities the Army and Joint Force need to win in a complex world.⁴ Learning provides essential building blocks for developing foundational capabilities that permit future Army leaders and teams to conduct joint combined arms operations, which expands on the traditional concept of combined arms that includes integrating Army capabilities with those of joint, inter-organizational, and multinational partners to accomplish the mission.

b. In preparing Soldiers, Army civilians, and teams for the range of military operations, the AOC emphasizes the need to integrate advanced technologies with skilled Soldiers and well-trained teams to maintain advantages over enemies. Decentralized joint combined arms operations in complex environments envisioned by the AOC require competent leaders and cohesive teams that thrive in conditions of uncertainty by executing the mission command philosophy fully. Army commanders understand cognitive, informational, social, cultural, political and physical influences affecting human behavior and the mission. Leaders exert influence to foster individual and team discipline, confidence, and cohesion through innovative, realistic training. Repetitive training combined with self-study, rigorous education in joint and Army institutions, and leader development ensures that Army forces thrive in chaotic environments.⁵ The AOC operationalizes learning by specifying the types of learning activities to reinforce and impart the competencies required of an Army learner, regardless of rank, assignment, duty position, or career path.

1-6. Linkage to The Army Human Dimension Strategy

The Army Human Dimension Strategy describes the need for Soldiers and Army civilians to thrive in chaos and ambiguity. The ALC-TE supports the human dimension goal by describing how the Army develops agile, adaptive, and innovative Soldiers and Army civilians with the competencies to build cohesive teams to win in a complex world. The ALC-TE further describes solutions to help optimize human performance, conduct realistic training in complex environments, and ways to adapt Army institutions to improve training and education.

1-7. Background

a. Combining both TP 525-8-2 and TP 525-8-3 into one concept presented a number of challenges. However, the biggest challenge was merging the Army's related but historically distinct training vs education cultures. Learning occurs in both training and education. However, Soldiers often see training as a field or unit task-based activity, while education brings to mind a specific learning institution or structured self-development activity. Both education and training must occur in both the operational force and the institution.

1-8. Assumptions

- a. The assumptions in the ACC and AOC are valid for this publication. ALC-TE specific assumptions include the following.
 - b. The Army will operate in an era of uncertainty and prepare for conflict against a full range of threats.
 - c. Army leaders, as stewards of the profession, will drive changes in the Army learning culture required by this concept.
 - d. The learner-centric, career-long learning model will produce the training and education outcomes to sustain Army effectiveness and ethical application of the Army Profession.
 - e. Learning science and technology will be advanced sufficiently, and Army efforts implemented adequately, to support this concept.
 - f. Training and education developments to support this concept will keep pace with projections.
 - g. Technology associated with learner-centric applications will be sustained and not disrupt implementation.
 - h. Soldiers and Army civilian learners will take advantage of the opportunities afforded by this concept.
 - i. Individual Army learners will understand that learning in all three training domains occurs as a result of individual choices.⁶
 - j. The Army training principles endure throughout the life of this concept.⁷
-

Chapter 2 Operational Context

2-1. Introduction

a. Learning is the acquisition of new knowledge or skill by experience, instruction, or study, or a combination of all three.⁸ In the Army, learning is continuous. It occurs in all training domains (operational, institutional, and self-development), by means of all pillars (training, education, and experience), and in all settings and environments (classrooms, training areas, joint, civilian, deployed, and others). The learning process involves internalizing and synthesizing information and knowledge and manifesting behaviors as competencies. Competencies are categorized as either technical or non-technical. Technical competencies are associated with a specific occupation or function to successfully perform the job task required. Non-technical competencies demonstrate the "soft skills" (leadership, ability to relate to others, etc.), or personal attributes associated with successful performance of current and future job tasks or mission requirements.

b. In its broadest sense, education conveys general bodies of knowledge and develops habits of the mind applicable to a broad spectrum of endeavors. Education is largely defined through *cognitive learning* (defined as content knowledge and development of intellectual skills) and *affective learning* (defined as the manner in which people deal with things emotionally: values, motivations, attitudes, enthusiasms, feelings, appreciation), and fosters breadth of view, diverse perspectives, jointness, critical analysis, abstract reasoning, comfort with ambiguity and uncertainty, innovative thinking, and ethical reasoning, particularly with respect to complex, non-linear problems.⁹ This contrasts with training, which focuses largely through psychomotor and cognitive learning on the instruction of personnel to enhance their capacity to perform specific functions and tasks.¹⁰ Training and education are not mutually exclusive. Virtually all military schools and professional development programs include elements of education and training in academic programs. Achieving success across the learning continuum relies on close coordination of training and education to develop synergies as personnel develop individually over time, acquiring and performing progressively higher order skills and responsibilities as their careers advance.

c. Based on experience, learning organizations adapt and adopt new techniques and procedures that get the job done more efficiently or effectively.¹¹ The Army is a learning organization that learns by repetitive execution to established standards in increasingly complex scenarios. The Army trains and educates its Soldiers, Army civilians, and teams while harnessing the experience of its people and organizations to improve the way it operates. Learning and leadership are at the core of the Army profession and essential to realizing the mission command philosophy. In the last decade, much learning concentrated on preparing the operating force for stability operations and counterinsurgency.

d. The Army relied on unit-focused, centralized, top-down, directed training to prepare for joint combined arms operations against specific adversaries in a particular theater of war. During this period, the Army educational community adapted to mission requirements and focused on cultural understanding, regional expertise, and language proficiency. Throughout, adaptability remained a distinguishing characteristic of the Army with Army leaders, trainers, and educators remaining innovative and flexible. They incorporated critical lessons learned into doctrine, training, and education. This is even more important going forward. Executing unified land operations against peer and near peer adversaries in highly contested operational environments successfully, requires an Army training and education learning enterprise that can innovate and adapt even faster than the last decade. In pursuit of these goals, Soldiers and Army civilians must promote a culture of continuous learning, adaptability, and innovation in the institutional and operational armies.¹²

e. The Army remains prepared to protect the homeland, foster security globally, project power, and win while maintaining high levels of readiness. Additionally, the Army delivers capabilities and capacities needed to achieve national security objectives to confront the challenges anticipated of the future operational environment.¹³ Future Army forces must prepare to conduct joint combined arms operations abroad to help protect or advance U.S. interests against adversaries able to employ a wide range of capabilities. The nature of this projected future calls for innovation of the Army's capabilities in a focused learning environment.

2-2. The future learning environment

a. Confronted with the future operational environment, the future learning environment must evolve to support the training and education requirements of teams, Soldiers, and Army civilians. Learning will focus on the learner; either the individual or the team. As the mix of traditional and non-traditional threats, or the operational environments change, learning products, processes, and supporting systems will adapt to support a new mix of capabilities, formations, equipment, and learning mediums. While many of the traditional means of individual and collective learning will endure, many others will be supplemented or replaced by technology and improvements in learning science. The Army and the Joint Force must stay at the forefront of learning science and technology to retain a learning advantage over adversaries and to preserve operational agility and overmatch over adversaries.

b. Replicating the complex global environment within the learning context and conditions is critical to providing tough and realistic training and education. This complex global environment involves operations among human populations, decentralized and networked threat organizations, information warfare, and true asymmetries stemming from unpredictable and unexpected use of weapons, tactics, and motivations across all of the training domains. Adversaries are likely to employ information warfare to degrade mission command capabilities or conduct global perception management and influence campaigns. Army training and education must account for these and other factors during training and education activities. Adaptability is paramount; the learning system must provide training and education solutions to teams, Soldiers, and Army civilians synchronized to the operational tempo. To meet these challenges, Army training and education must do the following:

(1) Portray the complex environment to develop leaders, Soldiers, Army civilians, and teams that understand the situation, apply appropriate judgment, adapt to changing conditions, and transition effectively between operations. Army training and education prepares Soldiers, and Army civilians to exercise mission command to exert influence on key individuals, organizations, and institutions through cooperative and persuasive means.

(2) Create situations allowing individuals and teams to master fundamentals and hone skills.¹⁴

(3) Present complex dilemmas forcing leaders to think clearly about war to match tactical actions with operational and strategic objectives.

(4) Create situations allowing individuals and teams to experience, become comfortable, and eventually thrive in ambiguity and chaos and then provide meaningful feedback on their performance.

(5) Provide the required repetition, under the right conditions and with the right level of rigor, to build mastery of both fundamental and advanced warfighting skills.

c. Army policy and procedures need to allow rapid adaptation of learning. Uncertain and complex operational environments require rapid adaptation of learning and continuous infusion of lessons learned. Curricula and learning products will need to adapt to include operational

environment implications to provide increased rigor and improve relevance. Curricula and learning products will need to adapt to allow Soldiers, Army civilians, and teams to use emerging technologies that will improve such media as distributed learning, interactive multimedia instruction, mobile applications, gaming, cognitive aiding tools, and embedded training. There will be a greater need to adapt the Army information network and information security to allow the growing need to train physically dispersed teams collectively, and to support an increased use of distributed learning at the point of need. Leaders require improved training management tools to more easily plan, prepare, execute, and assess training and education.

d. Learner-centric training and education requires institutional Army facilities to support remote locations. This requires collaboration between trainers and educators pushing for greater system access and security specialists trying to increase control of systems access. Advances in learning science and the Army's information systems must enable instruction to reach learning populations securely and effectively. The ability to distribute learner-centric training and education that optimizes human performance, (such as through a cloud based system, to individuals at the point of need), must be commonplace. However, training and education development may remain centralized for cost considerations.

e. Technology enables scalable, effective and efficient training and education. Projected technological innovations allow the inclusion of a dynamic operational environment to challenge future Soldiers and Army civilians thereby maximizing their learning potential. Improved technology allows leaders to train and educate individuals and teams at different levels of competence. Training and education complexity reflects the learning level of the students or teams. Technology supports improvement in multi-echelon training within the same group of learners.

f. Army leadership recognizes improving human dimension capabilities requires investment in future technologies. It is essential leaders look to the future having a smaller, leaner, more technologically advanced force with further emphasis on operations across the land, air, maritime, space, and cyberspace domains in contested environments. This force must understand more than the just the operation of technology. Technologies are tools, and tools are only as effective and adaptable as their operators. Soldiers and Army civilians will cycle through the institutional Army receiving a broader education in warfighting doctrine, history, science, mathematics, leadership, and the human dimension.

g. Chain of command involvement remains key to increasing readiness. The institutional Army will continue to support readiness with a blend of resident and distributed learning. Technology provides tools that expand the chain of command's ability to leverage learning to enhance readiness. However, advances in training and education technology alone will not increase Army readiness. Therefore, in the future, learning management will continue to be a shared responsibility between the learner, the training and education communities, and the chain of command. The institution develops and delivers training and education products and maintains the learning infrastructure. Unit leaders plan collective training, supervise its implementation, and mentor subordinates in a career-long learning continuum. Individuals accept responsibility to become career-long learners through training, education, and experience.

h. Soldiers and Army civilians who develop training and education must consider future learner capabilities and needs. Training and education must be interactive, engaging, and challenging to all types of learners; and at the collective level emphasizing collaborative problem solving events. Training and education must engage learners to think and understand the relevance and content of what they learn, acquiring and demonstrating their knowledge and ability to retrieve that knowledge, practice through repetitions and demonstrate their level of performance and adaptive capability for the future.

2-3. Drivers of agile change in Army learning

a. Many variables drive change in Army learning, including changes to any element of doctrine, operations, training, material, leadership and education, personnel, facilities, and policy (DOTMLPF-P), and/or solutions required to remedy performance gaps and identify requirements in training and education, and/or those directed by the commander and/or commandant and/or higher headquarters. The future operational environment necessitates an evolution of the Army learning environment, and leaders must first understand the drivers for change to identify gaps and requirements Army learning must address. Figure 2-1 depicts many of the variables that trigger a review and/or revision of Army learning.

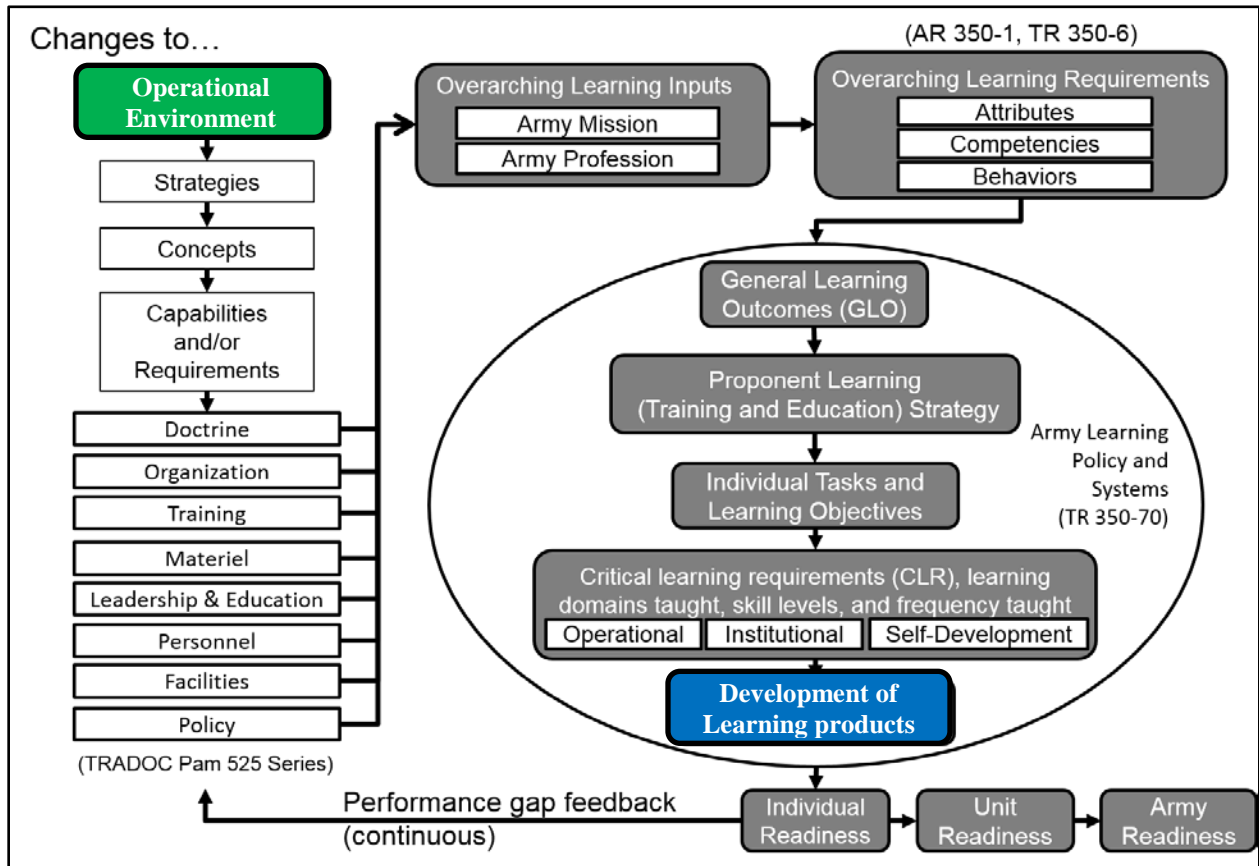


Figure 2-1. Army learning triggering circumstances

b. The gaps and requirements identification effort directly leads to a five phase systematic process centers and schools use to organize and guide learning product development activities:

analysis, design, development, implementation, and evaluation (ADDIE). The ADDIE process (figure 2-2) supports the development of the Army learning products to meet learning gaps and requirements, focus learning on critical job and/or function requirements, identify specific objectives the learning intends to address, provide assessment and/or evaluation feedback, identify alternative learning methods, and gain efficiencies by providing information that helps to focus resources on critical learning requirements. Continuous formative evaluation of outcomes from each phase, along with approvals, serves to eliminate or reduce wasted effort.

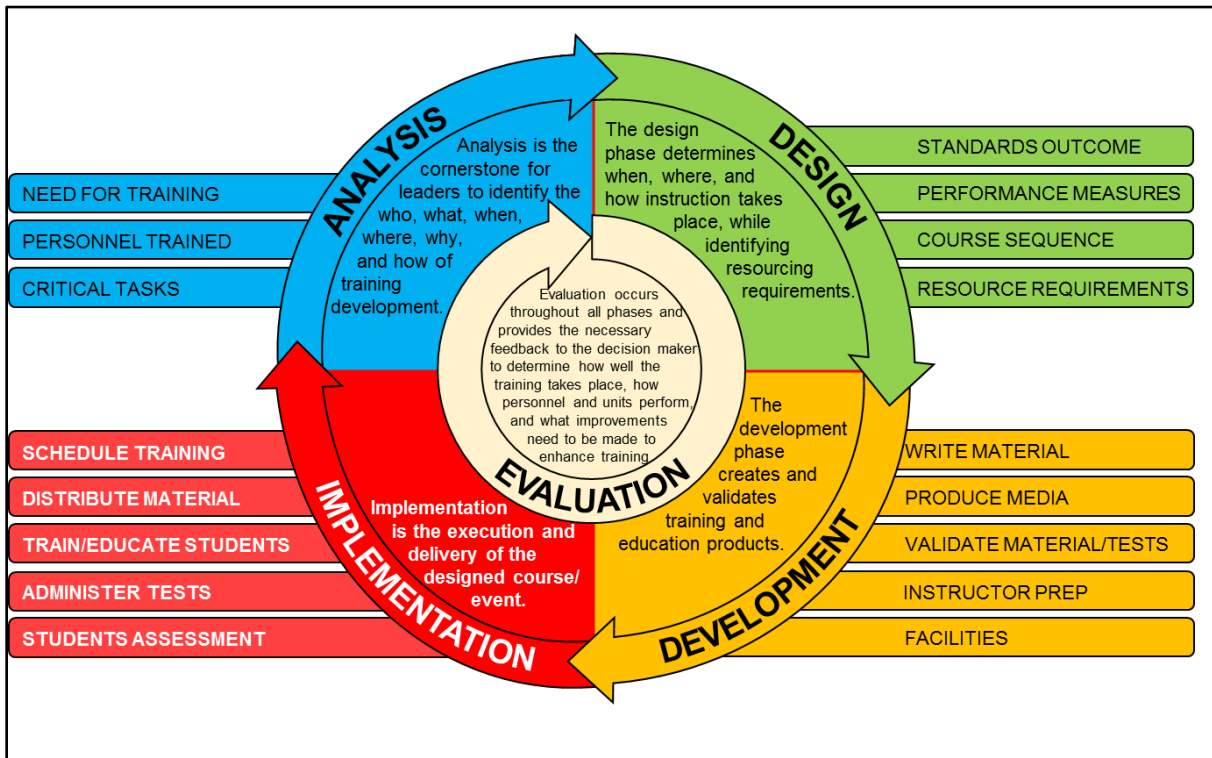


Figure 2-2. The ADDIE process for learning product development

c. The combination of gaps and requirements identification and learning product development must take place in an informed and agile way that addresses the military problem in a holistic manner. The focus on agility especially necessitates innovations in Army learning to produce new levels of advanced, state-of-the-art solutions that optimize the learning environment itself.

Chapter 3 Military Problem and Components of the Solution

3-1. Military problem

How does the Army create a learning environment that develops agile, adaptive, and innovative, Soldiers and Army civilians with the competencies that build cohesive teams to win in a complex world?

3-2. Central idea: Adaptive and continuous learning

a. The objective of Army learning is to provide forces, as part of joint, inter-organizational, and multinational efforts, that are trained and ready to accomplish campaign objectives and protect U.S. national interest. To achieve this objective, the Army will create and maintain a learning environment (figure 3-1) that develops agile, adaptive, and innovative Soldiers and Army Civilians, and builds cohesive teams that conduct training and education under tough and realistic conditions. This environment is centered on the learner (learner-centric), who learns through a combination of training, education, and experience through the three training domains of Army learning: operational, institutional, and self-development. Learning is agile and adaptive by quickly responding to identified gaps/requirements, while delivering the learning when and where it is needed. Learning is continuous and progressive in that the learner relies on close coordination of training and education, coupled with gains in experience, to acquire and perform progressively higher skills and responsibilities as their careers advance. Learning is also outcomes based, focused on producing defined outcomes that meet specified goals through rigorous assessment.

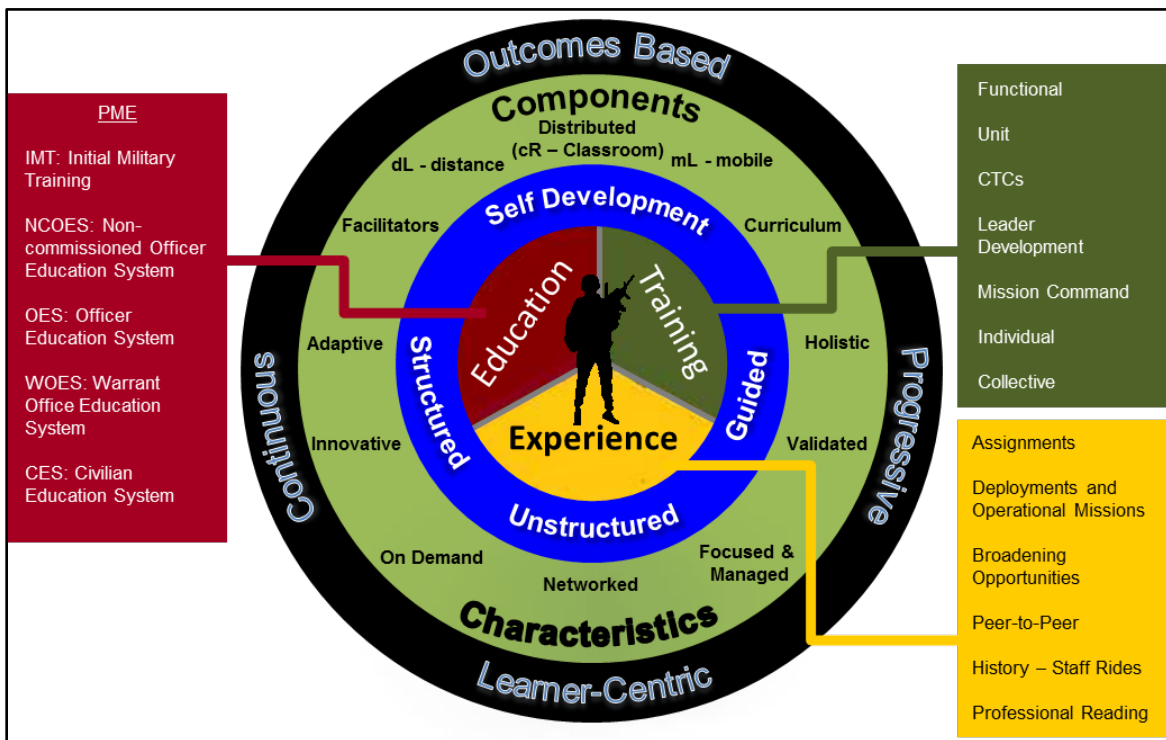


Figure 3-1. The Army learning environment

b. To optimize human performance, the Army must adapt as learning science evolves and technology advances. Innovation in individual and collective learning and learning infrastructure, and training and education human capital development remain ongoing goals. One key focus is making each learner an active participant in designing their individual learning curriculum. This is especially true as noncommissioned officers, officers, warrant officers, and civilians transition from early training and educational opportunities to mid-career. Ultimately, each person is responsible for their individual career-long learning. This focus on innovative personalized learning systems can be revolutionary by making learning entrepreneurial throughout the Army.

3-3. Solution synopsis: Career-long, learner-centric approach to training and education

a. Learner-centric approach. The primary approach to ensure adaptation and continuity in Army learning is to focus on the learner; whether individual or team. Learner-centered instruction is a methodology that emphasizes the importance of understanding learner needs, interests, and abilities to inspire, challenge, and enable the learner. The rationale behind this methodology is sound. Soldiers and Army civilians are more engaged and enthusiastic about learning if it is adjusted to individual aptitudes and there is value to their duty assignment. Additionally, direct leader support and ongoing educational mentoring will boost confidence and ability to apply new knowledge.¹⁵ The learner-centric approach must be aligned to the enduring roles of officers, warrant officers, non-commissioned officers (NCOs), and civilians.

(1) Officers are essential to the Army's organization to command units, establish policy, and manage resources while balancing risks and leading and caring for their people and families. They integrate collective, leader, and Soldier training to accomplish the Army's missions.¹⁶

(2) Warrant officers possess a high degree of specialization and depth of technical knowledge in a particular field and provide quality technical and/or tactical advice, counsel, and solutions to support their unit or organization. The warrant officer contains both technical and warfighting experts. Technical warrant officers (such as, logisticians) administer, manage, maintain, operate, and integrate Army systems and equipment across the full spectrum of Army operations. Warfighting warrant officers (such as, aviation, special operation forces) are innovative integrators of emerging technologies, dynamic teachers, confident warfighters, and developers of specialized teams of Soldiers.¹⁷

(3) NCOs are responsible for setting and maintaining high-quality standards and discipline. They are standard-bearers and role models critical to training, educating, and developing subordinates. NCOs are accountable for caring for Soldiers and setting the example for them. NCOs have roles as trainers, mentors, communicators, and advisors.¹⁸

(4) Civilians provide mission-essential capability, stability, and continuity during war and peace to support Soldiers. Major roles and responsibilities of Army civilians include establishing and executing policy; managing Army programs, projects, and systems; and operating activities and facilities for Army equipment, support, research, and technical work.¹⁹

b. Continuous learning engine. The implementation of an adaptive and continuous career-long learning model, begun a few years ago, requires the Army to move away from episodic individual learning events where Soldiers and Army civilians periodically participate in resident or non-resident instruction. The relationship between the learner and Army learning institutions must continue to expand to a career-long continuum of guided resident and non-resident synchronous (learning at the same time) and asynchronous (learning at different times and/or at different locations) learning events with opportunities designed to achieve established learning objectives and master competencies throughout the length of Army service.²⁰ There must be seamless transitions as Soldiers move into and out of operational units and institutional opportunities. The Army will accelerate the development of adaptive and predictive learning engines to reinforce and prevent the typical fading and decay of critical knowledge and skills and expand the permanence

of knowledge to help achieve better outcomes and Soldier and civilian synthesis and adaptive capability. The Army will be a leader and drive innovation in the competency based assessment and learning arena.

c. Training approach.

(1) Commanders and leaders will develop and execute unit training that builds on competencies individuals gain through the institutional and self-development training domains. Unit training and learning requires an environment and infrastructure that incorporates authoritative training resources and technologies that allows commanders and leaders to compress planning time; the end result is more time for training. Training must be tough and realistic focused on building cohesive teams that thrive in ambiguity and chaos and fight as part of the Joint Force executing multi-domain battle. To provide a complex, realistic training environment, virtual, constructive and gaming must converge into a common training simulation for the operational, institutional, and self-development training domains across all echelons. This enables units to conduct multiple iterations of complex operations on the terrain that they will fight, increasing individual and unit training proficiency so that units can then master tasks and build confidence in the live environment.

(2) The training environment will operate over the Army network, from the cloud, stimulate all mission command information systems, and utilize low overhead training aids, devices, simulators and simulations that deliver training to the point of need. A common and holistic training information infrastructure will complement the training environment by distributing training and education products seamlessly to institutions, units, and individuals and enabling the efficient use of training resources. This is a powerful approach that improves readiness and provides a common operating training picture to enable commanders to focus more time on training execution.

d. Education approach.

(1) Army institutions create and sustain a learner-centric environment by focusing on the dynamic interaction between faculty, students, and relevant, outcomes-based programs of instruction or curricula. Recruiting, developing, and sustaining world class instructors is essential. Faculty qualifications, military and civilian mix, and learning facilitation skills vary depending on an institution's mission, student composition, and size. Learner-centric environments engage students in frequent context-based problem solving exercises, and, depending on the student population, by encouraging peer-to-peer learning. Students' experience influences the nature and complexity of classroom and distributed learning experiences.

(2) Sustaining relevant, outcomes-based programs of instruction and curricula requires a training and education development workforce with appropriate skills and knowledge. The education approach requires institutional commitment to student learning assessment and measuring learning transfer for leaders, Soldiers, and Army civilians in an operational context. The education approach employs technology to facilitate point of need access to information and learning content, while simulations enable problem-based learning and creative application of concepts and knowledge. In learning institutions, technology requirements are based on achieving

specific learning outcomes; shape facilities and infrastructure planning; inform workforce skills development; and support program of instruction and curriculum design.

e. Blended learning environment. When fully implemented, the learning environment envisioned in the ACC will blend learning distinctions between the institutional Army and the operational Army. Differences will become less distinct as the future force grapples with sustaining and improving special operations and conventional force interoperability, expanding space and cyberspace operations rapidly, and using information technologies in the field and the classroom. To leverage these capabilities properly, the schools and centers will continue to receive and incorporate feedback from the operational Army into instructional general learning outcomes to support ongoing operations. The operational Army will stay attuned to what the learning institution teaches or provides through self-development and blend it into unit and organizational training. The trainer in the field and the teacher in the classroom will remain the link between these two entities. To reinforce this link, the Army must make faculty assignments coveted by top quality officers, warrant officers, noncommissioned officers, and civilians in the operating force. To inspire students, educational positions will be filled by proven leaders certified in instructional technique. In turn, faculty members will receive field and leadership assignments where they apply in-depth knowledge gained in the learning institution.

f. The ALC-TE posits four themes that articulate refined adaptive and career-long learning: individual and collective learning, learning infrastructure development, human capital development, and learning science and technology application (figure 3-2). The themes provide context for training and education capability requirements. These four themes are requisite components of the solution to provide training at the point of need and education at the proper time in a learners' career-long professional development. The Army builds on decades of self-development and institutional and operational training and education to mature a learning continuum. The proper articulation of these themes is necessary to sustain a career-long, learner-centric training and education environment. The adaptive and continuous learner-centric approach must make irrelevant where the individual Soldier or Army civilian learns. Learning can be through structured or non-structured self-development, while matriculating in the institutional Army, or participating in training with a unit at home station, at a combat training center, or while deployed.

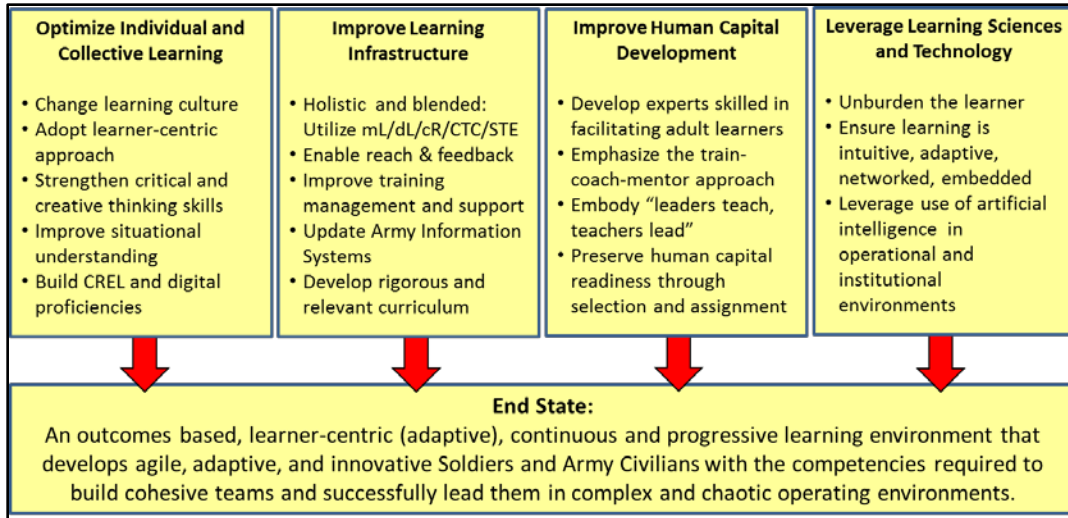


Figure 3-2. Four themes of the ALC-TE 2020-2040

3-4. Individual and collective learning: Optimizing human performance

a. Introduction. Individual and collective learning improvement are training challenges for the Army. In recent years, many of the difficulties encountered in strategic decision making, operational planning, training, and force development stemmed from neglect of continuities in the nature of war. A learner-centric approach to individual and collective training promotes learner readiness and motivation to think clearly about future warfare.²¹ The intent is to develop a cognitive advantage through increased breadth and rigor of learning in the art and science of war, critical and creative thinking, and situational understanding. Soldiers and Army civilians focus on mastering general learning outcomes, performance of critical job related tasks, essential competencies resulting from training, education, and experience at each level in a career. The Army uses a blend of technology-based, self-paced instruction, facilitation, and structured and guided self-development activities, combined with face-to-face, leader-driven, synthetic, collective training and instruction, to build individual and collective competence. Army learners adapt and apply learning through repetition to produce cohesive combined arms teams.

b. Embed a career-long learning culture.

(1) The Army must support the growth of all learners throughout a career-long learning continuum in preparation for increasingly challenging learning experiences. Learner-centric training and education require individual commitment to a career-long decentralized learning process based on individualized needs. Leaders at every echelon engage as active participants in the individual’s career-long learning process. Leader participation becomes the key enabler to an individual’s commitment to career-long learning. Talent assessments and management processes across the learning continuum also play a vital role in the development of Army professionals. Assessments supported by learning activities foster better preparation of learners for attendance at professional military education (PME). Talent management ensures selection of the best qualified students for selective levels of PME and broadening educational opportunities.

(2) The Army career-long learning process aims to develop attributes and mature skills into competencies for Soldiers and Army civilians. This process teaches common knowledge and skills and imparts specialized competencies into individuals based on Army roles. Transition to a refined learner-centric Army with blended technology-based, self-paced learning and face-to-face instruction requires a culture shift, especially for the operational Army. An Army cultural norm implies that active Soldiers are on duty 24-hours a day. In practice, this is only true during field training and deployments. The typical workday contains duty and non-duty time, generally in contiguous blocks. Furthermore, reserve component Soldiers are required to balance civilian and military careers and--unless mobilized--are only on duty during periods of drills, annual training, or to attend institutional training and education.

(3) For Department of the Army civilians the civilians duty day is dictated by government laws and employment terms; typically a 40-hour work week. The career-long learning process needs to reflect the unique characteristics of each cohort. Learners will need to customize training and education to fit their individual needs, and study wherever and whenever time permits. Future Army training and work schedules in the generating and the operating force must be flexible enough to enable and facilitate individual learning within the normal duty day, as appropriate. The old model of 1-n task lists and whatever doesn't fit in the PME curriculum or operational duty day gets added as mandatory off-duty development is not sufficient. Some may be necessary, but prioritization requires Army leader decisions on what to do and also what not to do. This prioritization is one of the leader's most important roles to enable right outcomes.

(3) Culture shift led by senior leaders. The implementation of a career-long learning continuum necessitates senior leader involvement to promote the required changes and acceptance of the new way of thinking about learning. Soldiers and Army civilians, with direct supervisory support, embrace learning as an individual responsibility that can occur independently or collectively, in the operational, institutional, and/or self-development training domains.

c. Identify, assess, and catalog learned competencies. Identifying, assessing, and recording individual learned competencies is essential to improved individual development, better talent management in assigning personnel to jobs that best match individuals' capabilities or best support their continued development for future leadership positions, and enhanced unit readiness. All learning content within a learning outcomes-based environment should be associated with one or more competencies or their subordinate parts, through the **Army learning area (ALA)** and/or **general learning outcome (GLO)** individual competencies framework. This framework ensures linkage between individual and collective competencies, directly impacting unit readiness. Individual competencies should be captured within an easily accessed and maintained information system. Each competency should include a modular breakdown of supporting knowledge, skills, abilities, behaviors, and experiences, which may be nested into multiple subordinate levels. Successful completion of learning experiences (whether in formal, informal, or operational contexts), should award credit (or micro-credit) towards these outcomes, and when possible, be further recognized through credentialing. The system must also recognize the perishability of acquired skills and accommodate tailored relearning based on each learner's unique retention abilities.

d. Apply learning competencies. The traditional view of training and education is that the Army trains for certainty and educates for uncertainty. The educational development of characteristics such as critical thinking, ethical reasoning, judgment, understanding the situation, and problem-solving must accompany hard tactical and technical skills. Those who enter the Army as Soldiers and Army civilians arrive with a wide variety of physical, moral, and educational attributes. The Army uses this new talent to meet Army needs and support operational success. The skills developed through training lead to competence. Competence is necessary to make decisions, large and small, under realistic conditions to give Soldiers and Army civilians a foundation to build tactical, technical, and ethical proficiency. Further, competence at the tactical level of war provides a firm foundation for understanding continuities in the nature of war at the operational and strategic levels of war.

e. Strengthen critical and creative thinking.

(1) Army training and education seek to develop adaptive Soldiers and civilians capable of operating in uncertain, ambiguous environments amid chaos. The effort requires a focus on improving adaptability, mental agility, judgment, innovative thinking, and knowledge. This requires cultivation of critical thinking and creative thinking skills which are indispensable requirements for effective training and education. Critical thinking is the intellectually disciplined process of actively and skillfully conceptualizing, applying, analyzing, synthesizing, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action.²² The *elements of thought* (thinking parts) and the *standards of thought* (thinking quality) support quality critical thinking. Quality critical thinking demonstrates clarity, accuracy, precision, consistency, relevance, sound evidence, good reasons, depth, breadth, and fairness.²³ The key to developing effective critical thinkers is to develop leaders who are purposeful and reflective. Creative thinking involves creating something new or original; thinking in innovative ways while capitalizing on imagination, insight, and novel ideas. Effective critical and creative thinking are essential for successful application of all three Army planning methodologies; troop leading procedures, the military decision-making process, and the Army design methodology.

(2) Soldiers and Army civilians receive periodic instruction in critical and creative thinking, but the Army recognizes that repetitive practice best reinforces these competencies. This practice derives from solving problems large and small, simple and complex. At its optimum, Army training and education create experiences in institutional and operational armies where Soldiers and Army civilians engage in creative and critical thinking with feedback from unit and organizational leaders or trainers who have proven a deep understanding of critical and creative thinking. They will use experience, training, education, questioning, critical and creative thinking, and collaboration to develop solutions. Practicing creative and critical thinking in a non-threatening schoolhouse or training environment enhances problem-framing (design) and problem-solving (planning) skills.

f. Create situational understanding. Developing situational understanding is an essential part of future force learning; a vital element to successfully conducting joint combined arms operations in a complex world. Soldiers and Army civilians must operate effectively under conditions of uncertainty and understand the interactions required by complex and dynamic human

environments. Training and education must develop skills that enable Soldiers, Army civilians, and teams to reduce uncertainty through understanding the situation in depth, developing the situation through action, actively scanning the environment for information, and constantly reassessing the situation to keep pace with the dynamic nature of conflict.

g. Build cultural understanding, regional expertise and language proficiency. Over the past fourteen years of war, the Army has recognized the need for its forces to be culturally aware, culturally empathetic, regionally informed, and to use the appropriate language to facilitate communication and improve understanding with the nation's joint, interorganizational, and multinational partners, and local populations. A force that is empathetic culturally, that is, being able to walk and think in the shoes of another, will be able to get in the adversaries' decision cycle, and to communicate more effectively with coalition members. This will require critical thinking emphasis on understanding cognitive frameworks and the worldviews of adversaries and partners. Cultural understanding, regional expertise, and language proficiency (CREL) are key enablers that allow the Army to respond globally and engage regionally to conduct joint combined arms operations. Units and teams must train to use available CREL assets and tools such as interpreters and automated language translation devices. The Army must continue to drive cutting edge development of cultural and language learning tools. Soldiers and Army civilians must be able to access CREL expertise and learning products on demand. Army learning must enable Soldiers, Army civilians and teams to be confident when interacting with people of different cultural backgrounds and perspectives within an unfamiliar environment.

h. Developing strategic thinkers.

(1) Military strategy is the art and science of aligning military ends, ways, and means to support national policy objectives. Formulating military strategy is difficult because of the multiplicity and complexity of threats and the consequent need to integrate military capabilities with other instruments of national power. To succeed at the task, the Army must develop strategic thinkers among its military and civilian leaders. Strategic thinkers have the intellectual tools to serve as planners, advisors, and leaders at the most senior levels of command, and they are ideally suited to collaborate with civilian leaders in formulating military strategy.

(2) Developing strategic thinkers is a long-term process that builds on formal education, operational assignments, broadening experiences, and self-development. As Army leaders engage in such activities over the course of a career, they learn to think critically, creatively, and systematically; employ an ethical reasoning framework; evaluate contrasting viewpoints; apply historical lessons; and draw valid conclusions. Strategic thinkers anticipate problems and apply creative solutions in response to unexpected developments. Additionally, they drive innovation and lead change in complex organizations and in uncertain environments.

i. Encourage technological proficiency.

(1) Modern information technology and associated social media provide the opportunity for sharing information across wide populations within and without the Army. Cognizant of operational security concerns, Soldiers and Army civilians use online social media and other applications to facilitate problem solving, collaboration, information sharing, and provide or obtain

virtual learning opportunities. The Army encourages use of technology for social interactions and collaboration that have become critical aspects of the digital learning environment.

(2) The ability to navigate the digital world assists learning. Blogs and other social media contribute to peer-based learning and broader discussions in today's classrooms.²⁴ An element of successful peer-to-peer information sharing is a system of established guidelines and security protocols to maximize the value of peer-based learning and information sharing. Individual development strategies consider the prior knowledge, experience and attributes of the learners, tailoring learning to the individual's talent and experience level. Individual and collective learning adapt to take advantage of changes in experience over time. Individual development activities will offer opportunities for learners to provide input into the learning system throughout their career to add to the body of knowledge. Army leaders must leverage this capability to build dynamic vertical and horizontal social networks for formal and informal information sharing.

(3) Technology must be mastered to contribute to readiness. Technological advances must complement and augment Soldier abilities, decrease their cognitive burden, increase trainability, and enhance—not inhibit or distract—teams to win in a complex world. Often, without active management, efforts to field additional capabilities inadvertently increase equipment and system complexity without regard to learner impact. The future operational environment and advances in technology could drive the fielding of new and improved equipment and systems with increased complexity. It is important for material and requirements developers to consider reducing systems complexity to minimize the impact of complexity on the learning environment. When systems complexity cannot be reduced, system developers must ensure technological enhancements are transparent to the user to lessen the training burden and enable the technology to gain acceptance. The goal must be to design a system so that its operator can use it intuitively with little training.

(4) More sophisticated systems will not necessarily make things simpler for the operator. Excessive train-up associated with new or upgraded systems negatively impacts the institutional Army and potentially degrades unit readiness as trainers and learners struggle to master the new level of sophistication. The Army will continue to view fielding technology through the eyes of the learner, understanding the relationship between the systems and required training. The Army must design and engineer systems to meet technical requirements and facilitate individual and collective learning to meet the demands of the operational Army. Human factors and ergonomics must be preeminent in system design and employment. Facilitating learning is a requisite burden of technological design; trainers and educators should not be required to become experts in system or application design to adapt the technology to meet learning outcomes.

j. Build cohesive combined arms teams.

(1) Cohesive combined arms teams trained and educated to employ the full range of joint and Army capabilities to fight and win across the range of military operations represent the final products of Army learning. Leaders need effective and efficient training and educational resources to provide a realistic training environment that can approximate the complex operational environment. The Army expects commanders of active Army units to achieve brigade-level decisive action proficiency, less brigade and battalion live-fire, at home station; commanders of reserve component units are expected to achieve company-level proficiency at home station. The

leaders of these active and reserve component combined arms teams must also be skilled in team building to maximize combat power.

(2) Army forces often operate with partners. Training, education, and experience within the Army are important in developing emotional and social intelligence and fostering interpersonal and collaborative skills necessary to build cohesive, joint, inter-organizational, and multinational combined arms teams at all levels of warfare. However, broad educational opportunities outside the Army in government and international relations, coupled with experience in the multinational environment, are also required. An advanced degree is helpful in understanding the complex political world, but the relationships formed in these types of broadening experiences contribute equally to future operational success.

3-5. Learning infrastructure development: An appropriate environment for learning

a. Introduction. An innovative and diverse learning environment throughout the career-long learning continuum supports active and reserve forces, and provides tailored learning solutions to the needs of the four cohorts and the reserve component.²⁵ Training and education infrastructure provides the foundation for creating a learner-centric environment. This infrastructure consists of processes and resources, designed to be integrated and interdependent to provide learning when and where needed.²⁶ The Army learning infrastructure supports all Army learning activities and includes the Army's information network and other basic components such as training and education development, training support, and feedback mechanisms. Infrastructure refinements must provide boundaries for Army learning without being too prescriptive. Soldiers and Army civilians use the infrastructure to acquire and develop the learning competencies to perform their duties and accomplish their mission successfully.

b. Refine learning infrastructure.

(1) Infrastructure is the basic framework of a system. The Army training and education infrastructure directly and indirectly supports learning in brick and mortar classrooms, through distributed learning, digital deployable training facilities, digital device usage, and at home station and combat training centers. The learning infrastructure includes tools that represent an operational environment in the live and synthetic training environments. This complex and realistic training environment optimizes human performance in the operational, institutional, and self-development training domains across all echelons as the training and education environment for the future Army.

(2) The learning infrastructure will be more than a menu of live, virtual, constructive, and gaming options. The infrastructure must enable learners and permit adjustments to learning outcomes and training objectives in response to complex environments. The infrastructure must be tailorable and scalable to fit the desired learning outcomes and training objectives rather than adjust the training to conform to the available system infrastructure. The infrastructure must offer learning products over current and future Army live and distributed learning systems and enable trainers and educators to adhere to the Army's training and leader development doctrine.²⁷ As with all technology-based constructs, the infrastructure for training and education requires

leadership to adhere to the principles of unit training and leader development, especially the principle that commanders and other leaders are responsible for training and leader development.²⁸

(3) A realistic training and education infrastructure will phase in from 2020 to 2040. This infrastructure will host digitized learning content that includes a suite of approved common scenarios with associated databases, a mission-focused orders suite for both friendly and enemy forces, and fully developed actor taxonomies that describe the political, military, economic, social, infrastructure, information, physical environment, and time structure for role players to accurately portray the operational environment.

c. Provide training support. Installation training support will remain a cornerstone of the learning infrastructure. A professional Army uniformed and civilian workforce will plan, implement, and maintain programs to use the Army information network fully and provide sustainable and modernized ranges, maneuver areas, training aids, devices, simulators, and simulations, instrumentation, digital learning centers, and information systems. The end state of installation training support is to enable cohesive trained and ready combined arms formations.

d. Enable reach and feedback.

(1) Reach is the process to obtain information to support learning requirements. Information must flow both ways. Reach has traditionally been associated with forward deployed organizations (operational forces) and their ability to access resources in the institutional Army. Reach also involved those operational forces not deployed to reach forward with requests for information from forward deployed subject matter experts. The Army must expand reach to include the learner by making knowledge available to all Soldiers, Army civilians, and teams continuously at the point of need. Army schools must have the same situational awareness of the operational environment as the operational force. Reach also extends to the ability to improve research and publication to create and exploit a unique cognitive advantage over potential adversaries. These activities serve as the primary source for the development and dissemination of new knowledge. Research includes private industry, academia, faculty, students, and Army institutions to establish a broad network that connects Army research priorities and requirements with academic resources and organizations effectively.²⁹

(3) Analyzing historical experiences is another form of feedback. Unit command historians and Army historical organizations such as, the Combat Studies Institute within Army Press, through the collection and interpretation of military history, provide a context to make informed decisions relative to the Soldier experience, and organizational and institutional change.³⁰ Army historians interview campaign participants and research operational records to develop narratives rich with information on recent operations. These professionals interpret historical data and artifacts through analysis and synthesis of the past, which they relate to current mission and organization issues.³¹

(4) During the conflicts in Afghanistan and Iraq, the Army refined its feedback systems by adapting. This adaptation will continue as the force refines the learner-centric training and education system in response to feedback. Feedback systems, such as the Center for Army Lessons

Learned, remain important not just to the individual, but also to training and education leaders and developers who use them to improve learning products and systems, incrementally and rapidly.

e. Improve training (learning) management.

(1) The Army currently encourages the Army learner to measure, track, and manage mastery of learning outcomes based on reliable performance metrics and measurement tools through a web-based portal to improve learning products. The portal provides military and civilian leaders an interface that communicates training enabler and learning resource needs directly to the appropriate training support provider for scheduling and distribution. Army leaders use training management tools for collective and individual training management. Technology-facilitated training management tools assist in planning, scheduling, resourcing, recording, and reporting on learning activities for individuals, and teams. The training management tools and portals need to be expanded to support the unique requirements that enable education-based learning. The training management tools need to be available through the Army information network. The future learning management system supports online career planning and tracking to enable the individual and unit managers to monitor learning and determine individual training status at any time from any location.

(2) Technology-facilitated training management allows individuals to determine present learning status (such as, in the form of a competency-based information system), and affords unit or organizational leaders the same opportunity. Access to individual automated training records allows aggregation so that leaders can identify training and education needs and determine learning requirements for teams. They then can determine if these learning needs are best met within the unit, at home station, or require support from regional or Army-wide training resources. Individual readiness levels contribute to measuring mission readiness.

(3) Managing training and education experiences remains a primary challenge for Army uniformed and civilian leaders. The Army training management process provides the tools to plan, prepare, execute, and assess training. Army training, education, and leader development recognizes that Soldiers and civilians are adults who adhere to the six core principles of adult learning: the learner's need to know; self-concept of the learner; prior experience of the learner; readiness to learn; orientation to learning; and motivation to learn.³² Army learning is not entirely self-directed, but mission-focused based on the team's mission essential task list and civilian competencies. The opportunity for broader, in-depth learning increases the more the individual sees the training and education in the institutional, operational, and self-development training domains as relevant to individual development and mission accomplishment.

f. Provide a complex and realistic training environment. Individual and collective competency development is facilitated through the use of a realistic training environment that approximates the complex operational environment. The training environment must provide, to the fullest extent possible, representative human interactions, meaningful social-cultural situations, superior target engagements, and improved casualty assessments enabling the creation of ambiguous, complex, and challenging situations.³³ As technology advances, the Army will move from an integrated environment to a future Army training environment that converges virtual, constructive and gaming simulations creating a fully integrated synthetic environment. Coupled with live training,

this future training environment will provide Soldiers, Army civilians, and teams the ability to rapidly assess the operational environment; determine training and education outcomes; develop training and education programs, products, and support; portray the operational environment; and distribute Army training and education at the learning point of need.

g. Control cost. Training and education for the Army must be achieved through cost-effective strategic investment. Budgetary constraints will require an immersive virtual training and education system that is both effective and efficient. Effective in that it trains what is necessary and efficient in using the resources available wisely. Development follows the rubric to buy once and use many times. Regardless of the cost of development, to be of use in training, education, and leader development, a learning infrastructure must be tailorable, scalable, and require low overhead. For the individuals and teams the training information infrastructure will be secure, low cost in manpower and other resources, and interoperable with joint and Army mission command information systems and other components of the integrated training environment. The system must promote cost effective synchronization of training resources that build unit capability through combinations of live, virtual, constructive, and gaming training constructs.

h. Learning using the Army information network.

(1) The learning environment requires an Army information network that links learners' devices with enhanced learning enablers, and up-to-date training facilities to support on-demand learning across the three training domains. The Army information network must deliver training and education resources on a global basis. Learning on the Army information network will exhibit several characteristics. Soldiers and Army civilians will have access to training and education regardless of location. The Army information network will be comprehensive and allow continuous access to data repositories of training and educational resources. Simple and robust procedures will enable the hosting system to handle multiple simultaneous users. The Army information network will accommodate individual learners engaged in self-development, small teams at dispersed locations, and large-scale exercise confederations at the same time. Regardless of the technology, the Army information network will allow users easy access with a simple, persistent identity for all users and be compatible with common industry standards. The Army information network must be adaptive, flexible and reliable to support learners regardless of local connectivity, limited bandwidth, availability of trained technicians, state of network management tools, and other obstacles to the integrated training environment.

(2) The Army empowers learners with access to relevant learning content on-demand through search engines and information repositories that match the speed and reliability of industry standardized learning products. Relevant training and education products and services will be accessible in easy-to-use formats with access from external personal computer systems into military systems. Whether intended for a personal hand-held mobile device or a professionally managed computer array, the network application will provide the requested information through distributed learning systems or home station workstations. Army information network access will be available to learners at the Institutional Army education facilities, remote training centers, deployed locations or learning facilities outside the Army.

i. Provide experts and authoritative sources.

(1) A learner may not be the expert in the processes or subject matter under study. Learners therefore, need experts to facilitate learning. Experts include seasoned trainers, skilled teachers, experienced instructors, and adept facilitators. The experts provide subject matter expertise at the point of need whether the interaction is across post, to a remote location within the U.S., or to a distant site overseas.

(2) The learning environment must provide access to authoritative resources. Authoritative resources include libraries, subject matter experts, and comprehensive informational databases. Designated teachers, coaches or mentors responsible for guiding learning in an interactive manner can be experts and authoritative resources. Learners can ask experts or authoritative sources questions and discuss various aspects in an effort to advance their quest for learning.

(3) Authoritative sources can emerge from socialized solutions among experts. The Army's challenge is validating these socialized solutions as an authoritative source to ensure that the socialized solution is doctrinally correct and relevant. Army leaders maintain system security, verify participant's readiness, maintain quality standards, and qualify facilitators charged with maintaining authoritative sources.

j. Develop curriculum.

(1) The Army schools and centers, task proponents, and the operating Army identify what tactical, technical, and leader curriculum is needed to support the individual and collective requirements for Soldiers and Army civilians. ALAs derive from Army leadership doctrine and capstone concepts. ALAs focus common training and education on topics critical to developing Army leaders. GLOs support the ALAs providing learning content developers with the general statements of the essential outcomes resulting from training, education, and experience along the career continuum of learning. GLOs lead to course outcome statements that specify what learners will know, do, or demonstrate when they have completed the instruction. GLOs for officers, warrant officers, NCOs and civilians promote progressive and sequential learning, enable cross-cohort integration, improve the quality and clarity of course outcomes, and focus assessment efforts in both classroom and unit contexts. Critical task site selection boards (for task based training) determine the tactical and technical needs of learners at each stage in the learning continuum.

(2) Relevant curriculum, designed to achieve rigorous learning outcomes, is vital to developing leaders who innovate faster than their adversary, and improve and thrive in uncertainty and chaos. The Army must transform curriculum and the learning content development process leveraging best practices in the learning sciences. To support holistic learning, outcomes and assessments will expand across the cognitive, affective, and psychomotor learning domains. The curriculum development process supports creation and tailoring of unique projects, designs, and other works for students' use in real-world situations to solve complex real-world problems.

3-6 Human capital development: Set conditions for effective learning

a. Introduction.

(1) Human capital development is essential to the Army's future success. Army learning human capital includes faculty: leaders, mentors, teachers, instructors, facilitators, training managers, and training developers who facilitate the development of individual and collective competencies through training and education. Reinvesting skilled military and civilian manpower in the institutional Army is critical to achieving learning outcomes successfully. The Army must develop experts skilled in facilitating adult learners. To develop human capital effectively and achieve the Army goals, the Army must emphasize the train-coach-mentor approach, embody "leaders teach, teachers lead," and manage specialists.

(2) Human capital development is synchronous with the leader development process. Both processes are deliberate, continuous, sequential, progressive, and grounded in Army Values, the Warrior Ethos, and discipline. Leadership is the capstone of human capital development. As the capstone, leaders must direct teams and organizations to plan, execute, and assess programs to develop the human capital in all three training domains. Leaders, in their roles as teachers must be knowledgeable, skilled, competent, and confident to properly train and educate those who will transfer their competencies to the uniformed and civilian force.

b. Preserve human capital readiness.

(1) Soldiers with recent operational experience provide an extensive pool from which to draw human capital. The Army must select and develop future teachers with relevant experience from those who have successful experience at war and other broadening experiences. However, experience alone is not sufficient; not all individuals with operational experience are well suited for the platform or to serve as teachers. Teachers must possess the intellect, judgment, and disposition to teach.

(2) Individuals who have studied their profession to a great depth, whether military or civilian, are valuable assets to retain as trainers and educators. Army leaders must attract and reward the best-qualified teachers to increase the quality of learning events, whether those events are face-to-face or through distributed learning. Retaining the best teachers requires senior leader direction and a cultural shift to keep the best and the brightest in (and returning to) the classroom, but the adage must become, "those who can, do, and those who have done well, teach." The sustained career progression of selected teachers will determine whether the Army is selecting its best and brightest to become keepers of the Army Profession as it rotates them between institutional and operational assignments.

(3) Leadership principles can be taught and so can methods and techniques to teach. A robust, progressive, and sequential faculty development program is essential to human capital development in the institutional Army. Leader development includes refining attributes, knowledge, and skills for teachers that produce results in the learning institution and prepare the faculty member for return to the operating Army. Early identification of effective teachers along

with comprehensive initial orientation followed by periodic sustainment of the behavioral and technical demands of the profession ensure a competent and up-to-date workforce.

c. Teach, coach, and mentor. Experienced teachers, coaches and mentors support career-long learning, meeting the needs of current and future leaders, Soldiers, and civilians. The Army must educate teachers, coaches, and mentors on the learner-centric approach to training and education. A learner dominated environment requires focus on the individual being taught rather than the method of teaching or organization conducting the training. Training and education facilitated by a teacher, coach and mentor must appeal to the learner.

d. Embody “leaders teach, teachers lead.” The Army expects leaders to teach and teachers to lead. However, the warfighting demands of the past conflicts favored the operational army at the expense of the learning institutions. To restore balance, Army leaders will embark on a program to select, develop, and assess experienced professionals continuously from officer, warrant officer, NCO, and civilian grades assigned as teachers. This reinvestment will help the Army identify suitable teachers, positioning them in assignments that permit maturation, growth, and reward through recognition and promotion. These programs must include a continuing education requirement to ensure those selected maintain currency in their area of expertise. The program’s intent is to produce superior teachers and training and education developers, grounded in the Army Profession, knowledgeable in emerging learning technologies, possessing sufficient CREL expertise with balanced experience in institutional and operational assignments.

e. Manage specialists.

(1) The Army must manage educational specialists. The Army learning community includes an instructional corps of multi-disciplinary teams composed of highly skilled specialists in areas such as instructional design, modularization, media development, gaming, and simulations to develop training and instructional support products that contain innovative, evidence-based learning strategies to support time-sensitive Army-wide on-demand learning. Members of these development teams are Soldiers, Army civilians, and contractors with advanced professional degrees, professional licenses or certifications, and appropriate expertise in specialties that support training and education development. Sustaining and retaining a skilled corps of educational specialists and integrating them fully by providing progressive and sequential professional development in the military disciplines they support is essential to future Army training and education efforts.

(2) Continued skills development is essential. Educational specialists require training and education activities to hone present skills and master new skills. The need for specialized professional expertise, fiscal constraints, and assignment realities necessitate the use of contractors as partners in instructional assignments and training development. Contractors are hired for their specialized expertise, or when intermittent needs arise. As contracts are renewed, it is important that the expertise requirements are updated. This effort, coupled with adequate contract oversight, facilitates optimum contract performance.

3-7. Learning science and technology application: Keeping pace with advances

a. Learning science, or pedagogy and/or andragogy, and technology application are interdependent with human interaction. Learning sciences are integral to individual and collective learning, and are neither training nor education centric. The Army recognizes the interdependency and works to design and implement learning innovations, improve instructional methodologies, and refine curricula to enable instructors, trainers, and teachers. The Army will address the interdependency that exists between teaching, learning, and emerging technologies effectively and ensure that new ideas, lessons learned, knowledge, and competencies combine to achieve and improve learning outcomes. This includes the need for Army research and development in the use of artificial intelligence technology in both the classroom and field training environments.

b. The impacts of factors in the human dimension occur alongside developments in computer and information sciences and considerations from the behavioral sciences such as cognitive and educational psychology and sociology and must be understood and managed as a complex system. Whenever human behavior and technology conflict in an organization, differences may manifest between any of the learning process stakeholders and technology application proponents. Because each party contributes to the delivery of learning products and process, integrated solutions are necessary or the learning process will be disrupted. Learning technologies, education materials, training resources, and digitized learning products create and sustain competencies when properly designed, developed, and implemented. Technology, protocols, and associated learning products must facilitate individual skill development, support collective skills, and lead to mission accomplishment.

b. Unburden the learner. Tools facilitating learning will evolve and adapt from 2020 to 2040 offering greater promise for mastering competencies across the ALAs. As improvements are fielded in learning methods and supporting technology, the Army strives to unburden the learner by placing the technological overhead within the learning system and not on the learner, trainer, or teacher. The individual can focus on mastering learning outcomes and not how to master the technology. Similarly, teachers can focus on the student and not the learning enablers. Low overhead, standard protocols, and systems commonality reduces the workload on the individual and unit permitting more time for training and education and less time learning how to operate the system. Over the long term, the Army will develop competency based learning profiles and invest in research on individual and collective knowledge decay and/or permanence and predictive patterns of performance competency. The Army will leverage the combination to drive better outcomes – at the scale of the Army. While no learning system is totally intuitive, the objective is to facilitate ease of use to enable the individual and teams to focus on mastering the learning (training, education) standard. Furthermore, if there are gaps in predicting where individual students or units are in terms of competency, the enterprise learning system has to be agile enough to inform and adapt.

c. Support learning.

(1) Technology is only one facet of learning. Automated systems that gather, categorize, assess, store, distribute, and dispose of training information serve as means to provide relevant, contextual, and time-sensitive learner-centric training and education. The Army will continue to

use technology to communicate throughout the force while managing information volume so that it is usable, indexed, and promotes knowledge exchange intuitively. The Army combines and integrates advances in learning technologies, learning science, and digital literacy to improve and modernize its learning model at an enterprise level. Technology supporting learning must engage and appeal to learners, while at the same time, expand their cognitive, interpersonal, and problem solving skills. Technology provides tools for individual, supervisory, and organizational oversight of career-long learning and Army learning needs.

(2) Technology investments address more than software to improve educational access. Investments must include delivery technologies and capacities such as cloud technology and virtual infrastructure. Resources to sustain, restore, modernize or replace legacy infrastructure must be considered in attempts to support and keep pace with learning systems advances. The way ahead includes courses of action that restore systems and infrastructure, modernize systems and infrastructure to meet enhanced and future capabilities, or replace systems and infrastructure where feasible and prudent.

d. Improve learning products.

(1) Army forces require adaptive learning products, applications, and templates for individual and collective training available worldwide using advanced systems that employ artificial intelligence and digital tutors to tailor learning to the individual's experience and knowledge level. Army leaders must have robust media and curriculum production capabilities. Production must meet home station training, distributed learning, and learning enterprise demands.

(2) Centralized learning product development and distribution will provide the institutional and operational armies with standardized materials where appropriate. The Army must assemble skilled multidisciplinary development teams, comprised of experts in subject content, educational theory, instructional design and development, and media development to develop standardized learning products which can be shared throughout. Distributed learning products must be routinely accessible and sharable to provide Soldiers and Army civilians job performance aids using libraries of common reusable learning content and performance support applications to maintain standards and update learning content.

e. Embed training.

(1) Army forces require an embedded training and planning capability in organic and issued equipment to provide Soldiers and Army civilians the ability to establish connectivity and learn during individual training opportunities and collective training events. Training anytime, anywhere provides an edge in familiarity and effective use of operational equipment. An embedded training and planning capability will be an integral and organic component of warfighting information systems. Embedded training will be interoperable with training aids, devices, simulators, and simulations, home station instrumentation training systems, the combat training centers, and information repositories. Soldiers operating from home station mission command centers improve competencies on mission command information systems and learn from deployed individuals and units. Embedding live, virtual, constructive, and gaming training into Army warfighting information systems enables individuals and teams to train as they fight. This

familiarity and repetitive effective use creates confidence in the systems, the individual, and the unit's ability to accomplish the mission.

(2) Embedded training and planning functionalities include a synthetic training environment; interactive multimedia instruction; training management; and the operational planning process.³⁴ Learning is facilitated by individuals who operate, maintain, and employ entire systems in training and combat environments. Embedded training available on the system, as well as through the Army information network, provides individuals, small groups (such as crews and staffs), and units the ability to train when and where needed for mission rehearsal and unit readiness.

(3) An embedded training and planning system will support training of joint combined arms operations from individual tasks through brigade-level collective training. Standardized, fully interoperable embedded training ensures each unit has real-time, globally distributed, near-real-world mission-rehearsal capability. Future Army leadership will provide management and oversight of embedded training and planning development and continued support of these systems, to include common user interfaces across platforms (where possible) and human factors engineering that makes interaction intuitive to reduce the need for system specific training.

Chapter 4

Conclusion

a. The goal of Army learning is to develop agile, adaptive, and innovative Soldiers and Army civilians with the learning competencies to generate and sustain mission capable teams using a learning environment enabled by an adaptive and continuous learning process. The ALC-TE provides broad intent and overall direction and guidance for balancing proven, traditional methods of training and education, while embracing evolutionary and revolutionary changes in teaching and learning methods and technologies as they apply to the institutional, operational, and self-development training domains.

b. The four co-equal thematic approaches of individual and collective learning, learning infrastructure development, human capital development, and learning science and technology application taken together are hallmarks of Army learning from 2020 to 2040. The robustness and thoroughness of Army learning contributes to disciplined initiative and the ability to be agile, adaptive, and innovative in fielding trained and ready teams, Soldiers and Army civilians to fight and win in joint combined arms operations in a complex world.

Appendix A

References

For all references: Army regulations, Department of the Army (DA) pamphlets, ADPs, Army doctrine reference publications (ADRP), field manuals, Army techniques publications, and DA forms are available at <http://www.apd.army.mil/> TRADOC publications and forms are available at <http://www.tradoc.army.mil/tpubs/index.htm> Joint publications are available at <http://www.dtic.mil/doctrine/>

Section I
Required References

ADP 6-22
Army Leadership

ADP 7-0
Training Units and Developing Leaders

Capstone Concept for Joint Operations: Joint Force 2020

TP 525-3-0
The U.S. Army Capstone Concept

TP 525-3-1
The U. S. Army Operating Concept: Win in a Complex World

Section II
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The Operations Process

ADP 6-0
Mission Command

ADRP 6-22
Army Leadership

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TP 350-70-12

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TP 350-37

Objective Force Embedded Training (OFET) User's Functional Description

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TRADOC Regulation 870-1

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Appendix B

Required Capabilities

B-1. Introduction

This appendix summarizes the required capabilities needed to support the ideas in the ALC-TE. During 2020 to 2040, the Army will leverage these capabilities to build and sustain a force proficient in joint combined arms operations to prevent conflict, shape the operational environment, and prevail in war.³⁵ These capabilities represent the Army's ongoing training and education efforts. To facilitate understanding and analysis, this pamphlet groups the capabilities into four themes: individual and collective learning, learning infrastructure development, human capital development, and learning science and technology application.

B-2. ALC-TE required capabilities

a. Future Army forces require the capability to conduct tough, realistic individual and multi-level collective training in the conditions that approximate the appropriate operational environment, with the institutional agility to assess and adapt the training conditions and associated training support enablers. (2-2.b.(1), 3-2.a, 3-3.c, 3-4.i.(1) 3-5.b.(2), 3-5.b.(3), and 3-5.f.)

b. Future Army forces require the capability to conduct training and education of cohesive combined arms teams able to employ the full range of joint, interorganizational, multinational, and Army capabilities, distributed across echelons and installations when required, in a realistic training environment that approximates the complex operational environment to fight and win across the range of military operations. (2-2.b., 2-2.b.(4), 3-3.c., 3-4.e., 3-4.i.(1), 3-4.i.(2), 3-5.c., and 3-5.g.)

c. Future Army forces require the capability to execute training and education within or across any of the three training domains to enable Soldiers, Army civilians, and cohesive teams to win in a complex world. (2-2.a., 2-2.b., 2-2.b.(1), 2-2.b.(4), 3-3.c., 3-4.c., 3-4.e., 3-4.h.(1), 3-5.b.(1), 3-5.b.(3), and 3-7.d.(2))

d. Future Army forces require the capability for Soldiers and Army civilians to gain experience working and training with allies, partners, commercial industry, academia, civic or government organizations, or other providers to develop and build skills for engagement, capacity building, and other shaping activities to support joint combined arms operations. (3-4.a., 3-4.e., 3-4.f., 3-4.i.(2), and 3-5.d.(1))

e. Future Army forces require the capability for Soldiers and Army civilians to conduct individual learning activities, resident and non-resident to meet command or career development requirements, with delivery across the training domains to support continuous adaptive learning. (2-2.h., 3-2.b., 3-3.a., 3-3.b., 3-3.d., 3-4.a., 3-4.b.(1), 3-4.b.(3), 3-5.g., and 3-6.c.)

f. Future Army forces require the capability for learning of functional and professional attributes, knowledge, and skills for individual and collective training developed under and trained within tough realistic conditions to give Soldiers and Army civilians fundamental tactical, technical, and ethical competence required to conduct joint combined arms operations. (2-1.d., 2-2.b.(2), 2-2.c., 3-3.a., 3-3.d., 3-3.f., 3-4.c., 3-4.i.(2), and 3-5.j.(1))

g. Future Army forces require the capability to conduct peer-to-peer learning to facilitate problem solving, collaboration, information sharing, and provide virtual learning opportunities. (3-3.d. and 3-4.h.(2))

h. Future Army forces require the capability to develop critical and creative thinkers with highly refined problem solving skills to build teams and collaborate with mission partners and meet the challenges of the future operational environment. (2-2.b.(3), 3-3.d., 3-4.a., 3-4.c., 3-4.d.(1), 3-4.d.(2), and 3-6.a.(2))

i. Future Army forces require the capability to train, monitor, and guide development activities of Soldiers and Army civilians to develop cultural understanding, regional expertise and language proficiency, and other aspects of cultural literacy to facilitate engaging regionally and develop partner relationships. (3-4.f., 3-5.e.(1), and 3-6.e.(1))

j. Future Army forces require the capability to train and educate strategic thinkers to formulate and implement military goals, determine actions to achieve the goals, and mobilize resources to execute the actions with mission partners at the operational and strategic levels of warfare. (2-2.b.(3), 3-4.c., 3-4.g.(1), 3-4.g.(2), 3-4.g.(3), and 3-4.i.(2))

k. Future Army forces require the capability for unit commanders and military and Army civilian leaders to identify and communicate training enabler and training resource needs directly to the appropriate training support provider for scheduling and distribution enabling them to plan and prepare training. (3-5.a., 3-5.c., 3-5.e.(1), 3-5.f., and 3-7.c.(1))

l. Future Army forces require the ability for Soldiers, Army civilians, and teams to participate in synchronous or asynchronous distributed learning with the ability for learners and teachers to customize training content and delivery to fit individual or unit needs. (2-2.c., 2-2.f., 3-3.b., 3-3.d., 3-4.b.(2), 3-5.b.(1) 3-5.b.(2), 3-5.h.(2), and 3-7.d.(1))

m. Future Army forces require the capability to use the Army information network construct to conduct training and education across the training domains to link the operating and institutional armies to training support enablers, digitized learning content repositories, and to support on demand learning. (2-2.c., 3-3.c., 3-5.a., 3-5.c., 3-5.d.(1), 3-5.e.(1), 3-5.h.(1), 3-5.h.(2), 3-7.b., 3-7.c.(1), and 3-7.e.(2))

n. Future Army forces require the capability for persistent and consistent access to reach and experts from the institutional Army to enable time-sensitive learning. (3-5.d.(1), 3-5.d.(2), 3-5.d.(3), 3-5.d.(4), 3-5.i.(1), 3-5.i.(2), 3-5.i.(3), and 3-5.i.(4))

o. Future Army forces require the capability for Soldiers and Army civilians worldwide to access adaptable digitized learning products that employ artificial intelligence and digital tutors to tailor learning to the individual's experience and knowledge level. (2-2.c., 2-2.d., 3-3.c., 3-3.d., 3-4.b.(2), 3-5.b.(3), 3-7.a., 3-7.d.(1), and 3-7.d.(2))

p. Future Army forces require the capability for learners at the individual or group level to have on-demand access to learning content wherever it resides with speed and reliability commensurate with available commercial products to facilitate a learner-centric training and education environment. (2-2.c., 3-5.e.(1), 3-5.h.(1), 3-5.h.(2), 3-5.i.(1), 3-6.e.(1), 3-7.c.(1), and 3-7.d.(2))

q. Future Army forces require a capability to enable commanders and leaders to assess and track management of learning (training and education) in their organization. (2-2.c., 3-5.e.(1), 3-5.e.(2), 3-5.e.(3), 3-5.e.(4), and 3-7.c.(1))

r. Future Army forces require the capability for Soldiers and Army civilians to track and manage training and education to empower them regarding career management. (3-4.b.(1), 3-5.e.(1), 3-5.e.(3), 3-5.e.(4), and 3-7.c.(1))

s. Future Army forces require the capability to integrate lessons learned and learner feedback to update training and education products rapidly and interactively, (3-2.b., 3-3.e., 3-4.b.(2), 3-5.a., 3-5.d.(2), 3-5.d.(4), 3-5.j.(2), and 3-7.a.)

t. The future Army requires the capability to select, develop and continuously assess an institutional workforce of experienced professionals grounded in the Army Profession, knowledgeable in emerging learning technologies and techniques, and with balanced experience in institutional and operational assignments. (2-2.g., 3-2.b., 3-3.d., 3-3.e., 3-6.a.(1), 3-6.a.(3), 3-6.b.(1), 3-6.b.(2), 3-6.b.(3), 3-6.c., 3-6.d., 3-6.e.(1), and 3-6.e.(2))

u. Future Army forces require the capability to integrate advances in learning technologies, evidence-based learning methods, and digital literacy to improve and modernize individual continuous adaptive learning. (2-2.d., 2-2.e., 3-4.h.(1), 3-4.h.(3), 3-4.h.(4), 3-5.a., 3-5.b.(3), 3-5.f., 3-6.d., 3-7.a., 3-7.c.(1), 3-7.c.(2))

v. Future Army forces require new or upgraded physical, virtual, and logical systems that are designed to reduce the training burden on Soldiers and Army civilians to facilitate use. (3-4.h.(3), 3-4.h.(4), 3-7.b., and 3-7.c.(1))

w. Future Army forces require the capability to conduct training, planning, mission rehearsal on organic and issued equipment and hardware to provide Soldiers and Army civilians the ability to establish connectivity and learn during training opportunities and collective training events. (3-7.e.(1), 3-6.e.(2), and 3-7.e.(3))

x. Future Army forces require competency based learning profiles for Soldiers and civilians and the capability to predict patterns of individual and collective performance competency to include individual and collective knowledge decay/permanence to optimize training and education outcomes and learning reinforcement regimes.

Appendix C

Training and Education Science and Technology

C-1. Purpose

This appendix summarizes how Army training and education-related science and technology (S&T) support implementation of the ALC-TE through the focused development and modernization of Army training and education capabilities. Army S&T focuses on achieving the ALC-TE's central idea of adaptive and continuous learning effectively and to help modernize training and education capabilities.

C-2. Introduction

To meet the challenge of a complex world, the Army must find ways to develop and modernize Army training and education capabilities successfully during a time of diminishing resources while maintaining the most highly trained, educated, and professional land force in the world. The Army must anticipate and adjust its training and education capability faster and more effectively than its adversaries. The Army must maximize its uses of science and technology to research and develop high pay-off technological solutions to solve the difficult challenges the Army will face in the fielding Force 2025 and Beyond. This requires a strong and focused Army training and education S&T research program.

C-3. Science and technology (S&T) focus areas

a. Realistic, mission command-centric synthetic training environment. Embedded and networked training environment at home station, combat training centers, institutions, and while deployed. Enable realistic training and education in the operational environment with decentralized and distributed operations, Army information network, and sensors.

b. Accessible learning capability. Accessible, responsive, and adaptive learning capability available worldwide at the point and time of need. Enable rapid development, adaptation, storage, and delivery of individual and collective training and education information and products.

c. Individual training for tactical tasks. Learner-centric systems that can adapt to the needs of the individual through timing, content, volume, means of delivery, and duration using a centralized training and education database with active monitoring and available mentoring. Tailor specific skills and knowledge level to needs of individual Soldier or leader. Provide embedded assessment and capability to support individual diagnostics to tailor and adapt individualized instruction, provide verification of mastery, and track preparedness for career progression.

d. Commander's interface. Ability for commander to interface and develop, view, and manage training events in real time by adjusting training conditions and activities. Provide situational awareness for the commander across training enablers. Allow commander to adjust training conditions, repeat training, and modify rigor, intensity, and complexity.

e. Virtual human. Virtual human capabilities to represent combatant and non-combatant forces, indigenous populations and culture, and mission partners across the integrated training environment to simulate the complexities of joint combined arms operations in any operational environment.

f. Adaptive training and education infrastructure. Responsive and adaptive infrastructure for leader development, unit training, capabilities development, and applications that incorporate emerging warfighting experience and knowledge rapidly and effectively into training and education in schools, teams, and through self-development.

g. Integrated enhanced realistic training capability. Develop and conduct integrated live and synthetic immersive training, up to brigade level rapidly, in conditions that closely resemble a complex operational environment.

h. Cultural awareness. Ability to understand, communicate, and coordinate effectively across diverse groups of people in a variety of cultures. Enable Soldiers and Army civilians to develop and sustain appropriate CREL in all operational environments.

i. Models and simulations for learning effectiveness analysis. Development of models, simulations or other tools for learning (training and education) effectiveness analysis, including competency based learning profiles. Develop predictive patterns of learning outcomes and performance competency, including individual and collective knowledge decay and permanence.

Predict impacts of proposed training and education products and programs and enable comparison of return on investment (time, manpower, money) across learning strategies.

C-4. Conclusion

Army S&T cannot predict with certainty what challenges and threats the future holds, but it can organize effectively to meet challenges addressed in this concept. Army S&T will focus on achieving an adaptive and continuous learning environment that develops agile, adaptive and innovative Soldiers and Army civilians. Transparency, efficiency, and flexibility in the structure and processes will help invest limited resources where they have the greatest payoff. Army research and investments in S&T are essential to help maximize the Army's strengths while offsetting its weaknesses to meet future Army training and education challenges. Army S&T investments must be focused on top priority training and education capability needs to achieve and maintain training and operational overmatch in the future.

Appendix D

Risks of Adopting the Army Learning Concept-Training and Education (ALC-TE)

D-1. ALC-TE risk

a. Future training and education success depends on the Army's imagination and willingness to adapt. Addressing the risk associated with adopting the ALC-TE builds on risks identified in the Capstone Concept for Joint Operations (CCJO), the ACC, and the AOC. Most of the risk statements described in these documents are not specifically applicable to the ALC-TE, but some dealing with technology and resourcing are important concerns for adopting the concept.

- (1) The communications networks required by this concept may be unavailable.³⁶
- (2) The pursuit of advanced technology may prove unaffordable.³⁷
- (3) Funding may degrade the ability of the Army to maintain and regenerate capabilities.³⁸
- (4) The Army training strategy may be under-resourced.³⁹

b. Strategic surprise. Strategic surprise is an unpredicted development that has a decisive, transformative, and sometimes revolutionary outcome. Strategic surprise confounds and negates strategy and purpose, not just objectives, but ultimately policy, thereby making irrelevant and futile any follow-on effort.⁴⁰

c. Mitigating CCJO, ACC, and AOC risks. Time, human capital, and financial resources are necessary to mitigate learner-centric training and education risks. Strategic surprise risks are mitigated with continued emphasis on adaptability in leaders, teams, and institutions that can learn and innovate while fighting. These innovative and adaptive leaders, educated and trained in the Profession of Arms, mitigate strategic surprise risks by employing regionally aligned forces to gain and maintain situational understanding and increase their awareness of the changing character of warfare.

D-2. Risk of not developing competent forces

The Army is the nation's dominate land power. It must be competent to execute joint combined arms operations. Experience produces competence, but experience alone will not ensure success. Experience becomes dated, can be backward looking, and is often resistant to new ideas and concepts that fly in the face of recent experience. To minimize risk the Army must capitalize on experience and reinvest it into training and education. Failure to properly build on experience and conduct training and education activities result in poorly executed Army operations. Training and education, properly planned and conducted, reinforces experience, reduces risk, and facilitates mission accomplishment.

D-3. Resourcing risk

a. The implementation of the ALC-TE may require people, facilities, and intellectual capital, with little visible gain in readiness. The risk of inadequate resourcing or intermittent implementation relates to quality impacts on the current and future development of Soldiers and Army civilians. There is a temptation to measure things easy to quantify like test scores and not evaluate more subjective things like readiness. This temptation must be resisted; the Army must exhibit the courage necessary to act on the intuitive albeit subjective judgment regarding the importance investing in education plays in Army readiness.

b. The technology to support the integrated training environment, distributed learning systems, and other key elements of the refined learner-centric approach will not be mature enough to support the concept. Intermittent and superficial implementation of technology and advanced learning systems in support of the proposed ALC-TE can produce uneven results.

c. Funding invested to create an adaptive and continuous learning environment may not produce the desired result in the time required. Money invested in a career-long, learner-centric approach to Army training and education may not give uniformed and civilian leaders a better trained and more competent Army in the time required to achieve established training readiness goals. If the innovations in learning in the Army learning institutions, at home station, while deployed, and through self-development recommended in this concept do not produce the expected results quickly there will be a temptation to discontinue implementation in search of strategies producing quicker results.

d. Operational necessity may cause the Army to revert to a centralized mission readiness exercise training and education model. The operational environment envisioned by Army leadership assumes the time to implement the decentralized learning concept described in this document. If domestic or overseas commitments require Army forces to train for a specific theater as they did from 2001 to 2014, circumstances may force the abandonment of the ALC-TE and the re-adoption of a centralized, resource intensive approach to preparation for operations.

D-4. Training and education continues in the Army regardless of funding and support

The initiatives discussed herein enhance training and education through the 2020 way point to 2040 in the far-term. The elements of the ALC-TE are to varying degrees interdependent. This interconnected quality provides redundancy precluding failure of adopting one aspect from causing the collapse of the entire learning concept. However, there will be an impact ultimately affecting

the current performance and future development of Soldiers and Army civilians. Implementing the ALC-TE, even when confronted with sub-optimal conditions, will ensure training and education continues to support mission accomplishment.

Glossary

Section I Abbreviations

ACC	Army Capstone Concept
ADP	Army doctrine publication
ADRP	Army doctrine reference publication
AOC	Army Operating Concept
ALA	Army learning areas
ALC-TE	Army Learning Concept-Training and Education
CCJO	Capstone Concept for Joint Operations
CREL	cultural understanding, regional expertise, and language proficiency
DA	Department of the Army
GLO	general learning outcome
PME	professional military education
S&T	science and technology
TP	TRADOC Pamphlet
TRADOC	U.S. Army Training and Doctrine Command
U.S.	United States

Section II Terms

adaptive learning

A method that endeavors to transform the learner from a passive receptor of information to a collaborator in the educational process and allows the student to tailor the learning experience (TP 350-70-12).

Army Values

Principles, standards, and qualities considered essential for successful Army leaders: loyalty, duty, respect, selfless service, honor, integrity, and personal courage (ADP 1).

cohort

A group of people who have something in common; for example, officers, warrant officers, noncommissioned officers, and Army civilians (<http://www.merriam-webster.com/dictionary/cohort>)

collective training

Training that pulls together the skills learned at the individual skill level and synchronizes those skills focusing on unit and leader proficiencies including unit-level tasks and events in multi-echelon, joint, interagency, and multinational force interoperability (ADP 7-0).

competencies

An observable, measurable pattern of knowledge, abilities, skill, and other characteristics that individuals need to perform work roles or occupational functions successfully (DODI 1400.25–V250).

distributed learning

Delivery of standardized individual, collective, and self-development training to Soldiers and Army civilians, units, and organizations at the right place and time through the use of multiple means and technology; may involve student-instructor interaction in real-time, nonreal-time, and self-paced student instruction without access to an instructor (TP 350-70-12).

education

Structured process to impart knowledge through teaching and learning to enable or enhance an individual’s ability to perform in unknown situations (AR 350–1).

embedded training

A function hosted in hardware and/or software, integrated into the overall equipment configuration (TP 350-37).

home station

The physical location where the majority of a unit’s training occurs, where individual skills are honed and unit readiness and cohesion are developed; a unit’s permanent location and/or habitual training sites (AR 350-1).

human dimension

The cognitive, physical, and social components of the Army’s trusted professionals and teams (The Army Human Dimension Strategy 2015).

institutional Army

Organizations and activities that generate and sustain trained, ready, and available forces to meet the requirements of the National Military Strategy and support the geographic commander, and administer executive responsibilities in accordance with public law (AR 350-1).

institutional training domain

System which primarily includes training base centers and schools that provide initial training and subsequent PME for Soldiers, military leaders, and Army civilians (ADP 7-0).

integrated training environment

a seamless interconnected combination of live, virtual, constructive and gaming simulations, scenarios, and Mission Command information systems (https://atn.army.mil/Media/docs/Leaders_Guide%20to_Training_in%20the_Integrated_Training_Environment_30SEP2014.pdf)

knowledge

Information, understanding, or skill that you get from experience or education (<http://www.merriam-webster.com/dictionary/knowledge>).

knowledge management

The process of enabling knowledge to flow to enhance shared understanding, learning, and decisionmaking (ADRP 6-0).

learning

Cognitive, affective, and/or physical process where a person assimilates information, and temporarily or permanently acquires or improves skills, knowledge, behaviors, and attitudes. In an Army context it involves study in a military or civilian institution, in the operational Army, or through self-development (Department of Defense Instruction 1400.25 V410, AR 350-1).

learning environment

The interaction of knowledge, the learner, instruction, networks, technology, and assessment (TP 350-70-7).

learning (training) infrastructure

The physical enablers of the integrating architecture and includes facilities, power, communications assets, the training support system, personnel and equipment, and management structure (TP 525-8-3).

learning outcome

A clearly defined statement of essential learning competencies that result from lessons learned from training, education, and experience (TP 350-70-7).

mission essential task

A major collective task a unit could perform based on its design—equipment, manning, and table of organization and equipment or table of distribution and allowances mission (ADP 7-0).

mission essential task list

A compilation of mission essential tasks (ADP 7-0).

multi-echelon training

A training technique that allows for the simultaneous training of more than one echelon on different or complementary tasks (ADRP 7-0).

operational training domain

Training activities organizations undertake while at home station, at maneuver combat training centers, during joint exercises, at mobilization centers, and while operationally deployed (ADP 7-0).

self-development training domain

Planned, goal-oriented learning that reinforces and expands the depth and breadth of an individual's knowledge base, self-awareness, and situational awareness (ADP 7-0).

synthetic training environment

Soldier-centric training environment that optimizes human performance by converging virtual, constructive, and gaming training environments into a single-synthetic training environment that provides a common training simulation for the institutional, operational and self-development training domains (<http://usacac.army.mil/sites/default/files/documents/cact/SpecificQuestions-RealisticTraining.pdf>)

training

Structured process designed to increase the capability of individuals or units to perform specified tasks or skills in known situations (Department of Defense Instruction 1400.25–V410, AR 350-1).

training and education development

Process of developing, integrating, prioritizing, resourcing and providing quality control, ,quality assurance of the Army’s training and education concepts, strategies and products to support the Army’s training and education of active and reserve Soldiers, civilians and units across the institutional, self-development and operational training domains (AR 350-1).

training enabler

Training resources, usually described in terms of human, physical, or financial means, that underpin the Army’s combined arms training strategies and facilitate training or enhance training realism to create the appropriate training conditions necessary to achieve specific training capabilities (AR 350-1).

training environment

An environment comprised of conditions, supporting resources, and time that enables training tasks to proficiency (ADRP 7-0).

training support

The entire spectrum of products, services, and facilities, that provide the networked, integrated, interoperable training support necessary to enable operationally relevant, full spectrum, joint, interagency, intergovernmental, and multinational training for Soldiers, Army civilians and teams (TP 525-8-3).

Section III

Special Terms

Army Learning Model

The Army’s adaptive, continuous learning model that is routinely improved to provide quality, relevant, and effective learning experiences through outcome-oriented instructional strategies that foster thinking, initiative, and provide operationally relevant context which extends learning beyond the learning institution in a career-long continuum of learning through the significantly expanded use of network technologies.

Force 2025

Force 2025 is a comprehensive modernization strategy conducted by and affecting the Total Army.

learner-centric

Learning that focused on the individual or team which fosters learning competencies with learning strategies, expert facilitators, and technologies that support the learner; both individual and collective training.

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- ¹ The formal definition of learner-centric is found in Section II (Terms) of the Glossary.
- ² Army Leader Development Strategy, June 5, 2013.
- ³ AOC, 31., para 3-5, conclusion, 24.
- ⁴ McMaster, LTG HR, *Military Review*, “Continuity and Change: The Army Operating Concept and Clear Thinking About Future War”, March/April 2015, 19.
- ⁵ AOC, 3-3j, 20.
- ⁶ Army Doctrine Publication 7-0, 23 Aug, 2012, page 1, para 1.
- ⁷ Army Doctrine Publication 7-0, 23 Aug, 2012, Table 1-1
- ⁸ The formal definition of learning is found in Section II (Terms) of the Glossary.
- ⁹ The formal definition of education is found in Section II (Terms) of the Glossary.
- ¹⁰ The formal definition of training is found in Section II (Terms) of the Glossary. Taxonomy of Learning Domains formulated by a group of researchers led by Dr. Benjamin Bloom in 1956 is a clear and effective model, for the explanation and application of learning objectives, teaching and training methods, and measurement of learning outcomes. The cognitive learning domain involves the development of mental skills and the acquisition of knowledge. The affective learning domain involves feelings, emotions and attitudes. The psychomotor learning domain is comprised of using motor skills and coordinating them.
- ¹¹ ADRP 6-22, para 7-17, 7-3.
- ¹² AOC, Preface, iv.
- ¹³ AOC, 3-5. Conclusion, 24.
- ¹⁴ Fundamentals are described in ADP 7-0, paragraph 28 and ADRP 7-0, paragraph 2-9.
- ¹⁵ Without direct supervisory support “only about 10% of learning transfer failure is due to training: 70% or more of such failure is due to something in the application environment” (State of the Industry: American Society for Training and Development’s (ASTD) Annual Review of Trends in Workplace Learning and Performance, ASTD, 2006); that “something” is lack of supervisory support. Additionally, Brinkerhoff, Telling Training’s Story, 2006; indicates if employees are properly supported (resourced) with pre-training participation, and post-training follow-up, “achieved sustained new behaviors” based on training/education research 85% vs. 15% for those who were, not supported.
- ¹⁶ ADRP 6-22, para 2-7, 2-1.
- ¹⁷ DA PAM 600-3, para 3-9, 19.
- ¹⁸ ADRP 6-22, para 2-13&2-15, 2-2.
- ¹⁹ ADRP 6-22, para 2-17&2-18, 2-2.
- ²⁰ The Army Training Strategy, Department of the Army, 3 October 2012, 9.
- ²¹ The term learner-centric applies to both individual and collective training. In individual training the individual is the learner. In collective training the team or unit is the learner.
- ²² Critical thinking as defined by the National Council for Excellence in Critical Thinking, 1987 accessed at, www.criticalthinking.org/pages/defining-critical-thinking/766.
- ²³ Critical thinking as defined by the National Council for Excellence in Critical Thinking, 1987 accessed at, www.criticalthinking.org/pages/defining-critical-thinking/766.
- ²⁴ Includes online communities to share information, ideas, personal messages, and other content.
- ²⁵ The four cohorts are Officer, Warrant Officer, Non-commissioned Officer / Enlisted and Army civilian groups of learners.
- ²⁶ U.S. Department of Education, National Education Technology Plan 2010, accessed at <http://www.ed.gov/technology/netp-2010>, Infrastructure.
- ²⁷ ADP 7-0, Table 1.
- ²⁸ ADP 7-0, Table 1.
- ²⁹ Examples of institutions include the Army Research Institute for the Behavioral and Social Sciences, Army Research Laboratory, Natick Soldier Research, Development and Engineering Center, Simulation and Training Technology Center, and Institute for Creative Technologies.
- ³⁰ Combat Studies Institute, <http://usacac.army.mil/organizations/cace/csi/about>.
- ³¹ TRADOC Reg 870-1, page 4, 1-4.
- ³² Malcolm S. Knowles et al, *The Adult Learner*, 7th Edition, Burlington, MA: Elsevier, 2005.
- U.S. Army Combined Arms Center, *The Enhancing Realistic Training White Paper*, January 2016
- ³⁴ TRADOC Pam 350-37.
- ³⁵ ADP 3-0, 1.
- ³⁶ CCJO chapter 5.
- ³⁷ CCJO, chpt 5.
- ³⁸ ACC paragraph D-1.b.(2).
- ³⁹ ACC paragraph D-1.b.(3).
- ⁴⁰ AOC.