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Welcome to the Conference Edition of the *Journal of Military Learning* (*JML*). This special edition includes papers presented to two conferences in the summer of 2022: the Army University (ArmyU) Learning Symposium and the iFEST (Innovation, Instruction, Implementation, Federal E-learning Science & Technology). The ArmyU Learning Symposium is a biennial conference to inform and further develop partnerships between military, government, academic, and industry partners to advance the learning sciences. iFEST is an annual conference hosted by the Department of Defense Advanced Distributed Learning Initiative to support the development and adoption of a data-driven DOD-wide digital learning ecosystem.

This edition of the *JML* is organized into two sections. The first section provides my overview of the 2022 ArmyU Learning Symposium and two articles on topics presented at the conference. The second section provides an overview of the 2022 iFEST conference by Dr. Scotty Craig of Arizona State University and four articles on topics presented at the conference. The edition complements the *JML's* core purpose to discuss current adult-learning and educational research from the military and civilian fields for continuous improvements in learning. The *JML* is published each April and October. There is an open call for papers; the submission guidelines are found at https://www.armyupress.army.mil/Journals/Journal-of-Military-Learning. Only through critical thinking and challenging our education paradigms can we as a learning organization fully reexamine and assess opportunities to improve our military education.

Dr. Keith R. Beurskens
Journal of Military Learning
Editor in Chief

Army University Learning Symposium 2022

Dr. Keith R. Beurskens

The 2022 Army University Learning Symposium was held 19–21 July 2022. This year's theme was "Modernizing Military Learning." The symposium was executed as a blended venue with an invitation-only, face-to-face session conducted on Fort Leavenworth, Kansas, and an open registration virtual session conducted online. The biennial Army University Learning Symposium was established to exchange ideas and promulgate cutting-edge learning sciences between military and civilian academia. Over 50 organizations attended the symposium to include all U.S. Army Training and Doctrine Command schools and centers. There were over 1,000 professionals who participated—more than 950 virtual participants and over 80 in-person participants. This year's focus areas included four major efforts: Army People First, Army Modernization, Talent Management, and new guidance for Outcomes-Based Military Education. Guest speakers included the following:

- Dr. Lyle J. Hogue, director, Strategy, Plans, and Operations Office, Office of the Assistant Secretary of the Army (Manpower and Reserve Affairs), discussed where we were, where we are now, and where we are going with the Army People Strategy and the supporting Civilian and Military Implementation Plans.
- Dr. Douglas M. Matty, director, Army Artificial Intelligence Integration Center, and Maj. Jason Zuniga, chief operations officer, Army Software Factory, discussed modernization and the role of artificial intelligence, and the mission of the Army Software Factory.
- Brig. Gen. Brett Funck, director of the Army Talent Management Task Force, discussed the way ahead for talent management and provided an overview of the Command Assessment Programs.
- Dr. Jack D. Kem, dean of academics and professor of the Command and General Staff College (CGSC), and chief academic officer, Army University, introduced the new Outcomes-Based Military Education guidance and the progress the CGSC has made to date in adopting the new approach.

The two articles that follow were the basis for presentations during the symposium. "Leader Presence and Its Impact on Organizational Climate" by Janetta Harris and Mounir Bouchareb, from the Center for the Army Profession and Leadership, highlights the importance of leader presence in the Army profession in two parts. First, the authors explain what leader presence is and why it matters. Then, the authors examine 10 factors

that affect organizational climate and how leader presence is integral to each of those factors. A leader's presence influences perceptions and engagement in a unit and is a crucial contribution to organizational climate.

"Modernizing the U.S. Army's Captains Career Course" by Maj. Elvin J. Fortuna of the Vice Provost of Academic Affairs, Army University, describes the most recent redesign of the course that increases the use of learning technologies and moves it closer to the future learning ecosystem concept. The 2023 course changes also set the stage for future modernization efforts that will expand upon the technological infrastructure, design, and policy dimensions of the course.

The next Army University Learning Symposium will be held in July 2024.

Peer Reviewed

Leader Presence and Its Impact on Organizational Climate

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Abstract

The Army is developing strategies and programs to build team cohesion and maintain positive organizational climates. Committed leaders are shoulder-to-shoulder with those they lead as they encounter obstacles. This article highlights the importance of leader presence in the Army profession in two parts. First, the authors explain what leader presence is and why it matters. Then, the authors examine 10 factors that affect organizational climate and how leader presence is integral to each of those factors. A leader's presence influences perceptions and engagement in a unit and is a crucial contribution to organizational climate.

A leader's presence is an essential aspect of leadership that touches daily activities as well as the perceptions, attitudes, behaviors, and performances of team members within the unit. This article discusses how a leader's presence is a critical element of leader effectiveness and an integral component of maintaining a positive organizational climate. This article cites doctrine, academic studies, and historical references to discuss leader presence from the individual leader perspective in part one and expands to how leader presence impacts an organization's climate in part two. Consider this historical example, which occurred on the eve of the Battle of Waterloo, to begin the discussion on leader presence. The British commander, the Duke of Wellington, stated about his French opponent, Emperor Napoleon Bonaparte, that "[his] presence on the battlefield 'was worth forty thousand men'" (Wellington Collection, n.d., para. 4). In this quote, Wellington acknowledges a link between Napoleon's presence derived from the emperor's leadership ability and how Napoleon's presence influences the climate of the entire French army. The impact on the climate was significant because once the French soldiers knew Napoleon was on the battlefield, their commitment to accomplish any assigned mission increased.

Descriptions of leadership and presence vary in academic literature. While research indicates leadership is both visible and physical (Ford et al., 2017), there are aspects of presence that are intangible. Authors and cofounders of The Ariel Group, Halpern and Lubar, provide an example. Using their description, leadership presence is "the ability to connect authentically with the thoughts and feelings of others, in order to motivate and inspire them toward a desired outcome" (Lubar & Halpern, 2003, p. 3). According to U.S. Army doctrine, presence consists of bearing, fitness, confidence, and resilience (U.S. Department of the Army [DA], 2019a). As leaders acquire experience and develop over time, they will increasingly demonstrate these four attributes. The point is not perfection but improvement as the attributes work together producing synergy. Therefore, while the physical attributes of a leader's presence become more visible to others over time, the intangible qualities are also under development. The following provides an overview of leader presence and briefly explains each presence attribute.

Leader Presence

Bearing

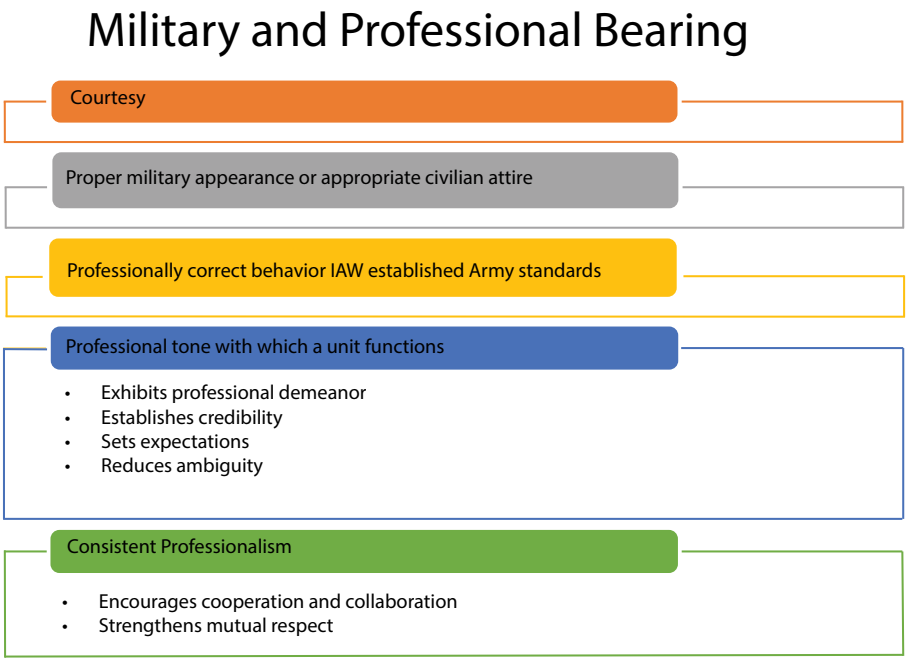
Bearing consists of courtesy, appearance, demeanor, and consistent professional behavior (DA, 2019a). While bearing includes one's attire and presentation, it is more than appearance, such as looking good or looking the part (Ford et al., 2017). Bearing is also founded on displaying courtesy and exhibiting professionally correct behavior. Arguably, the harder parts of bearing include establishing credibility, clarifying expectations while facing ambiguity, and maintaining composure in stressful situations. See Figure 1 for more details on bearing from the Center for the Army Profession and Leadership.

Fitness

For fitness, the U.S. Army employs a holistic health approach that encompasses a person's body, mind, nutrition, spirituality, and recharge abilities, as shown in Figure 2, the circle of health (DA, 2020b, p. 13-2).

The circle of health emphasizes the interaction of the individual with the community, prevention of disease, and treatment of illness and injury. Regarding fitness, leaders consider the whole person because the sum truly is greater than the individual parts. Leaders who emphasize the holistic health approach set a positive example by demonstrating the importance of the health factors. One example is the Civilian Fitness Wellness Program (CFWP); the CFWP promotes exercise, education, prevention, and overall quality of life (DA, 2015a). It is paramount for leaders to stay

Figure 1
Elements of Military/Professional Bearing



Adapted from *Army Leadership and the Profession* (Army Doctrine Publication 6-22), 2019, by U.S. Department of the Army.

healthy and fit to ensure they can make correct decisions to guide the entire organization. Finally, leaders exhibit consideration for others by encouraging fitness in their subordinates and upholding public health measures. A workforce with optimal health enables a greater level of readiness.

Confidence

Confidence is twofold; confidence is the leaders' belief in themselves and the team's belief in their leaders. First, "confidence grows from professional competence and a realistic appraisal of one's abilities" (DA, 2019a, p. 32). Leaders must be self-aware and honest with themselves and those they lead. Second, for the unit to be successful, the team must believe in their leader. One of a leader's highest praises is knowing that subordinates have confidence in their leader and are willing to follow that person through hardship if needed. An example of this happened in the

Figure 2
Circle of Health

Adapted from *Holistic Health and Fitness* (Field Manual 7-22), 2020, by U.S. Department of the Army; *What Is Whole Health?*, 2022, by U.S. Department of Veterans Affairs (https://www.va.gov/wholehealth/).

Janetta Harris has been an Army civilian for over 17 years. She served as a staff member for the Command and General Staff School (CGSS) from 2007 to 2017 and developed resident, Total Army School System, and distributed learning curricula while working with all six CGSS instructional departments. She currently works for the Center for the Army Profession and Leadership where she has performed the duties of quality assurance officer for accreditation and lead curriculum developer. She liaises with multiple organizations across the U.S. Army Combined Arms Center to include the U.S. Army Sexual Harassment/Assault Response and Prevention Academy, Army Management Staff College, Mission Command Center of Excellence Directorate of Training, and Army University. Harris holds a Master of Education; she has presented and published with the Association for Business Simulation and Experiential Learning.

Vietnam War in 1963 when Capt. Colin Powell exhibited confidence in front of his subordinate, Lt. Alton J. Sheek, while both served in combat as advisors to the South Vietnamese Army. Sheek commented on this experience with confidence in Powell and his ability to lead: "Colin had an air about him … he was very much in control of things and knowledgeable" (DeYoung, 2006, p. 61).

Resilience

The final attribute is resilience; it refers to the "ability to persevere, adapt, and grow in dynamic or stressful environments" (Army Resilience Directorate, n.d., "About" section). Resilience encapsulates how individuals recover and overcome adversity such as loss, disappointment, setbacks, or injuries (DA, 2019a). Intense emotional experiences like losing a soldier or a civilian team member can take a toll on a U.S. Army leader and lead to lingering emotions of anger, frustration, depression, or anxiety. Resilience is the process of overcoming these impediments, and it starts with the leader's mindset. Acknowledging a setback requires the self-awareness to understand how an obstacle affects the individual and the people around them. Life experiences, introspection, and learning are crucial building blocks in becoming a better leader and developing presence. Therefore, "developing presence will require you to go places and do things that feel uncomfortable, at least initially" (Halpern & Lubar, 2003, p. 3). The following discusses how the four presence attributes affect organizational climate.

10 Factors of Organizational Climate

Understanding the nuances of leader presence at the individual level can improve unit climate. Showing up and being seen are not enough (DA, 2019a); effective leaders demonstrate commitment to the organization through their presence. Further-

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more, how leaders present themselves to an organization can convey competence or ignorance. "Organizational climate refers to the perception and attitudes of Soldiers and Army Civilians as they interact … with their peers, subordinates, and leaders … The most significant influence on an organization's climate is the quality of its leadership" (DA, 2017, p. 2). Equally important, the Army has identified ten factors that affect organizational climates (Center for the Army Profession and Leadership [CAPL], 2020a). This section explores each factor in more detail and briefly explains the symbiotic relationship between leader presence and unit climate.

Leadership

The first factor and the tip of the metaphorical spear is leadership. "An Army leader is anyone who … inspires and influences people by providing purpose, direction, and motivation" (DA, 2019a, p. 113). Leaders serve as role models, take prudent risks, and prioritize workloads—all of which build a positive climate. A leader must confront harmful behaviors and take appropriate action to remove work barriers, which can have a negative impact on the unit climate. Additionally, a leader's attribute of bearing is visible in leader actions such as exemplifying the Army Values, enforcing standards, and providing guidance.

Communication

The second factor is communication, which includes verbal, nonverbal, active listening, and cultural awareness skills (DA, 2015b, 2019a). Communication enables effective leader presence; leader presence "influences the interpersonal behavior of interaction partners" (Madrid et al., 2016, p. 10). To communicate authentically, a leader builds trust by creating a feedback loop comprised of sharing information and incorporating feedback from others. These actions further develop the confidence of subordinates and maintain a positive climate by encouraging honest and candid communication. In addition to feedback, leaders must tailor their message to a spe-

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cific audience and consider both verbal and nonverbal forms of communication. For example, former U.S. Secretary of State Madeleine Albright used different pins on her suit lapels to communicate to people with whom she was negotiating. Her lapel pins were usually humorous, but that humor set the tone of the negotiation from which she could address U.S. national interests (Kirschner, 2022).

Respect

Every leader should start with introspection. "Ask yourself if you command respect because people *have to* respect you or, rather, because you've truly earned respect" (Whitehurst, 2015, para. 1). Conveying confidence and commanding respect as a leader depends on the professional bearing that leader portrays. Similarly, leaders set the example and treat all people with dignity and respect. The entire organization benefits from an atmosphere of dignity and respect; this professional behavior underpins all relationships. Lastly, a leader's words and actions must be consistent; otherwise, subordinates may lose respect for them and question legitimate orders or intent.

Cohesion

Cohesion is indispensable for establishing resilience and shaping a unit's climate. Leaders strive to foster an environment that values cooperation and exhibits esprit de corps. Conversely, if leaders are unsynchronized with their team, their disorganization can become a debilitating weakness and may hold the team back (Geiger, 2016). With cohesion, employees share best practices and lessons learned; they shun information hoarding. Leaders also use multiple forms of communication to create cohesion, reach audiences at multiple levels, and establish a shared understanding. Second, leaders inspire and motivate people into action through engagement. These actions may include creating meaningful group work that accomplishes the mission and achieves a higher purpose. Third, leaders promote inclusiveness—ensuring existing team members feel included and making newcomers feel welcome. All employees want to feel like valued team members who can exercise a level of autonomy in accomplishing the organization's mission.

Growth/Development

The fifth factor that influences climate in organizations is growth. Leaders should be self-aware, pursue development opportunities, and not conceal their self-improvement. Everyone has room for improvement, and everyone makes mistakes. Completing training events and learning from mistakes build confidence, resilience, and fitness. Moreover, a leader perpetuates a learning environment by encouraging professional and personal growth, as well as applying preventative measures for

harmful behaviors. Some aspects of a learning environment include challenging how the organization operates, discarding outdated procedures, and seeking new approaches to problems (DA, 2015b). As all employees may not be receptive to development, a leader must take the time to coach or mentor. A leader also pursues additional resources to train and develop subordinates so they can be more confident, resilient, and fit in mission accomplishment.

Adaptability

The Greek philosopher Heraclitus once said, "Change is the only constant in life" (King, 2019). A leader learns to surmount the fear of change and the unknown through adaptability. Adaptability will inevitably reflect one's presence, especially resilience and confidence, as the individual develops the skills and knowledge to adjust to new conditions. Displaying a willingness to compromise allows flexibility in achieving goals and improves organizational climate. For adaptability to become second nature, leaders should show agility through daily activities, allowing subordinates to observe and emulate. Other means include reinforcing versatility, encouraging creative ideas, and questioning assumptions. With practice, adaptability will enable leaders to move beyond baseline expectations and establish lasting credibility.

Empowerment

Some indicators of empowerment for a positive climate include providing broadening experiences, creating ownership of tasks, and building trust and confidence (CAPL, 2020b). Leaders should utilize an empowering presence. The process starts with self confidence, which gives the leader the ability to empower and inspire others. Leaders should allow their subordinates to practice decision-making and invite them to advise on important decisions. As leaders enable a learning environment, an empowering presence can transform situations and influence success. Furthermore, leaders expect their subordinates to demonstrate initiative and competence. "Empowered unit members are authorized to operate as they see fit within the limits of the commander's intent and resources available" (CAPL, 2020b, p. 10). This means leaders should delegate authority as needed and give subordinates the latitude to accomplish tasks and complete the mission (DA, 2019b), without the person in charge if necessary.

Recognition

As a leader's presence evolves, his or her sense of recognition and awareness becomes stronger and more attuned. Awareness should not be egocentric; leaders

should be humble about their personal accomplishments. Their awareness should be for the recognition of subordinates who are developing into future leaders. One example is a subordinate receiving an award for exceeding a standard. This type of recognition can contribute immensely to a junior leader's attribute of confidence and future performance. Leaders, therefore, must become adept at noticing others' contributions. Identifying a subordinate's contributions to mission accomplishment can positively affect organizational climate. When the leader recognizes the employees and values their choices, employees will have a greater level of commitment. These actions directly impact how subordinates perceive the leader and the presence they exude.

Discipline

Discipline reinforces leadership and climate. Military discipline consists of respect for authority, regulatory standards, training readiness, proper conduct, and obedience (DA, 2020a). Subordinates expect their leaders to enforce standards without deviation or partiality, demonstrate zero tolerance for unethical behaviors, and place the good of the organization above one's own needs. "Soldiers, leader and led alike, work together to accomplish the mission rather than feed their self-interest" (DA, 2020a, p. 2). Maintaining good order and discipline results in universal accountability and the prompt responsiveness to eradicate counterproductive leadership. Leaders with presence must be confident in their abilities and have the courage to do what is right. Leaders with bearing will set those expectations and enforce standards consistently across the formation.

Fairness

A leader with presence exudes a measure of fairness that is free from discrimination and is willing to stand for diversity and inclusion. This leader remains objective by prioritizing requirements and applying policy consistently to all members. An individual's performance and abilities should determine work assignments, opportunities for professional development, promotions, and awards (CAPL, 2020a). Moreover, favoritism has no place in a positive climate. Favoritism erodes morale, contributes to conflict, and correlates to higher employee turnover. Likewise, the perception of favoritism can erode the confidence of junior leaders. Leaders must have the bearing and confidence to do the right thing and address challenging situations like discrimination or favoritism when they occur. Additionally, a lack of transparency may contribute to a perception of unfairness, regardless of any unethical or illegal acts. Leaders must ensure their actions are above reproach and seek advice or counsel as needed. Ultimately, fairness creates better team alignment and sustains healthy unit climate.

Summary

The attributes of leader presence touch all daily activities, from the mundane to the extreme, and are an integral part of the ten organizational climate factors. Hence, an effective leader's presence helps to prevent counterproductive leadership and promote readiness throughout the unit. Frances Frei, a professor for the Harvard Business School, once said, "Leadership is about making others better as a result of your presence and making sure that impact lasts in your absence" (Sandberg, 2015, "Third, Nothing Is Someone Else's Problem" section, para. 6). Leaders use their presence to make the unit climate better and generate forward progress to overcome current and future challenges. Notably, effective Army leaders strive to improve the organization every day and accomplish the mission. These leaders embrace the Army Values and are better equipped to build and maintain positive climates.

Presence is about setting expectations without stifling initiative. Leaders understand their presence influences what subordinates do when the leader is present, as well as when they are not. Involvement includes leading from the front, awareness of soldiers' lives in the barracks, and everything in between. Presence does not mean leaders have to touch everything; obviously, that is impossible and unreasonable. However, when leaders fail to demonstrate presence, order is not maintained, and organizational climates suffer.

Similarly, leaders must share experiences with those they lead. What leaders do and what they condone lets their people know what is important. Sharing stressors such as anxiety and pain builds team cohesion, and subordinates will be more committed to follow the leader. Finally, leaders cannot distance themselves from their subordinates and expect their subordinates to respect and trust them. Leaders must understand their people and take care of them—that is the deeper part of presence.

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Peer Reviewed

Modernizing the U.S. Army's Captains Career Course

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Abstract

Army University has taken up the call to assess, adapt, and innovate professional military education by modernizing the Army's Captains Career Course (CCC). The modernized CCC aligns closer to the future learning ecosystem concept as described by the Advanced Distributed Learning (ADL) Initiative, particularly in the dimensions of technological infrastructure and design. The next iteration of modernization can expand on the human infrastructure of CCC, specifically in distributed learning. Future modernization efforts can expand on the technological infrastructure, design, and policy dimensions of CCC. This has the potential to further progress toward the future learning ecosystem ADL describes.

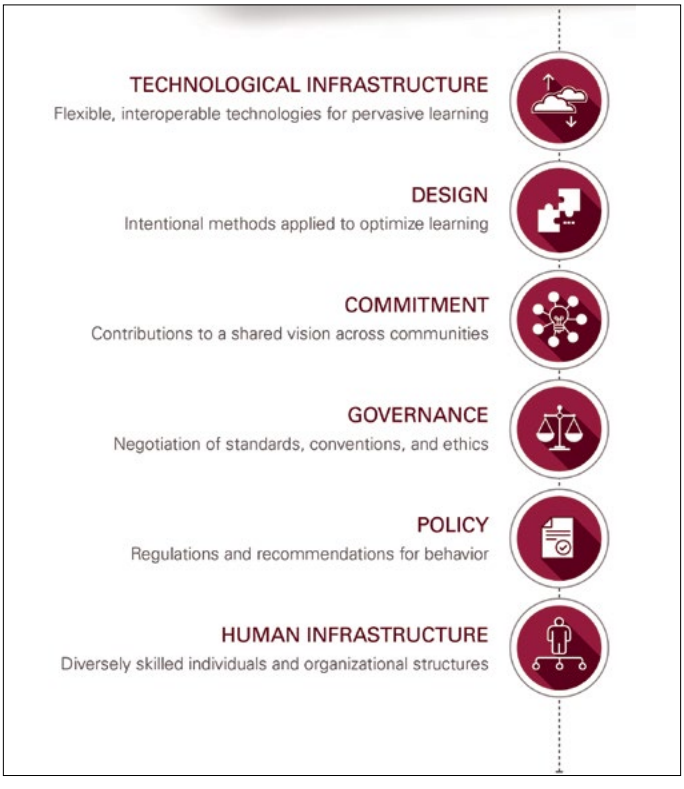
On 1 May 2020, the Joint Chiefs of Staff (2020) published their new vision for the future of professional military education (PME). They stated that the "PME enterprise must continuously assess, adapt, and innovate" (p. 5) to create intellectual overmatch against its adversaries (p. 2). In conjunction with Army schools and Centers of Excellence, Army University has taken up the call to assess, adapt, and innovate PME by modernizing the Army's Captains Career Course (CCC) for fiscal year (FY) 2023. The modernized CCC aligns closer to the future learning ecosystem concept described by the Advanced Distributed Learning (ADL) Initiative, particularly in technological infrastructure and design dimensions.

Modernization and the Future Learning Ecosystem

CCC modernization, like Army modernization, is a continuous process that involves the entire Army enterprise (U.S. Department of the Army [DA], 2019, p. 1).

Figure 1

Six-Dimension Future Learning Ecosystem



From *Modernizing Learning: Building the Future Learning Ecosystem*, 2019, by J. J. Walcutt and S. Schatz. U.S. Government Publishing Office.

Maj. Elvin J. Fortuna, U.S. Army, is an instructional designer in the Office of the Vice Provost for Academic Affairs at Army University. Since July 2021 he has contributed to the Army's Captains Career Course modernization effort to transition toward a blended learning model. He is a doctoral student in Michigan State University's Educational Psychology and Educational Technology program. He holds a BA in philosophy from the University of Maryland, College Park, an MS in management from the University of Maryland, University College, and an MA in higher education administration from the University of Louisville. Maj. Fortuna is a demonstrated master logistician who has deployed in support of Operations Iraqi Freedom and Enduring Freedom.

Figure 2

Five-Dimension Distributed Learning-Capability Maturation Model

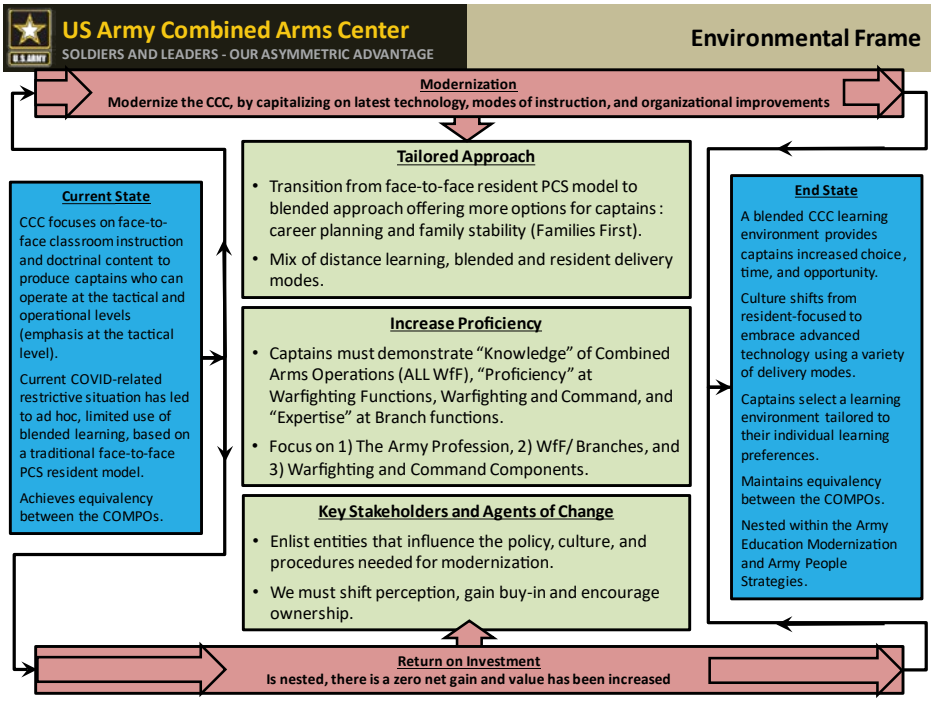
From *Advanced Distributed Learning: Capability Maturity Model*, 2020, by N. Malone, M. Hernandez, A. Reardon, Y. Liu, B. Smith, J. Gordon, B. Andrejevic, and M. Neeley. Advanced Distributed Learning Initiative.

The 2019 Army modernization strategy states, "the Army will update its leader development and education processes to increase critical, creative, and systems thinking so that the next generations of Army leaders are prepared for the complexities of MDO [multidomain operations]" (p. 8). The Army's push for modernization across the spectrum of doctrine, organization, training, materiel, leadership and education, personnel, facilities, and policy to meet the complexities of MDO necessitated a similar modernization effort for captains' education.

Understanding educational modernization requires a different concept than the concepts used for materiel or personnel modernization efforts. Army University's Office of the Vice Provost for Academic Affairs (VPAA) used the ADL

Figure 3

Army Design Methodology Environmental Frame for Captains Career Course Modernization



From *Tailorable Modernization Strategy (TMS) Model*, 2021, by N. Lequire, J. M. Persyn, and S. D. Celeen. Office of the Vice Provost for Academic Affairs, Army University.

Initiative's "Future Learning Ecosystem" concept to analyze CCC modernization efforts (Walcutt & Schatz, 2019). Schatz and Walcutt (2019) define the future learning ecosystem as "a transformation—away from disconnected, episodic experiences and toward a curated continuum of lifelong learning, tailored to individuals, and delivered across diverse locations, media, and periods of time" (p. 4). The future learning ecosystem is a shift from an industrial age model of learning at scale toward a learning model that is holistic, lifelong, and personalized (p. 5).

The future learning ecosystem has six dimensions: technological infrastructure, design, commitment, governance, policy, and human infrastructure, as shown in Figure 1 (Walcutt & Schatz, 2019, p. 12). VPAA modified the five-dimension ADL Initiative Distributed Learning–Capability Maturation Model to

maintain visibility on governance and policy dimensions (see Figure 2; Malone et al., 2020, p. 16).

CCC Modernization Design and Planning

Lt. Gen. James E. Rainey, the Combined Arms Center (CAC) commander at the initiation of the CCC modernization effort, directed CCC modernization in December 2020 (Office of the Vice Provost for Academic Affairs [VPAA], 2021a, p. 2). Rainey's guidance was to "create a flexible and adaptive course design responsive to future pandemic-like contingencies" (VPAA, 2021a, p. 2). Primary responsibility coordination fell to the office of the VPAA for Army University through its instructional design division (IDD). IDD conducted a series of design sessions in the second quarter of FY22 using Army design methodology to develop an operational approach (see Figure 3).

Staff work throughout six operational planning teams (OPTs) and dialogue with Army University and CAC leadership significantly changed the scope and pace of CCC modernization efforts. Initial objectives during OPT1 to create "options for TDY attendance during Resident Phase" and "flexibility in timing of attendance at Resident Phase did not come to fruition" (VPAA, 2021b, p. 9). Subsequent OPTs identified limitations in the Joint Travel Regulations that precluded providing flexibility on mode of attendance for a single course offering. Additionally, subsequent OPTs could not find acceptable costs for TDY attendance without reducing the resident phase of CCC to 14 weeks and four days (U.S. Army Combined Arms Center [CAC], 2021, p. 4).

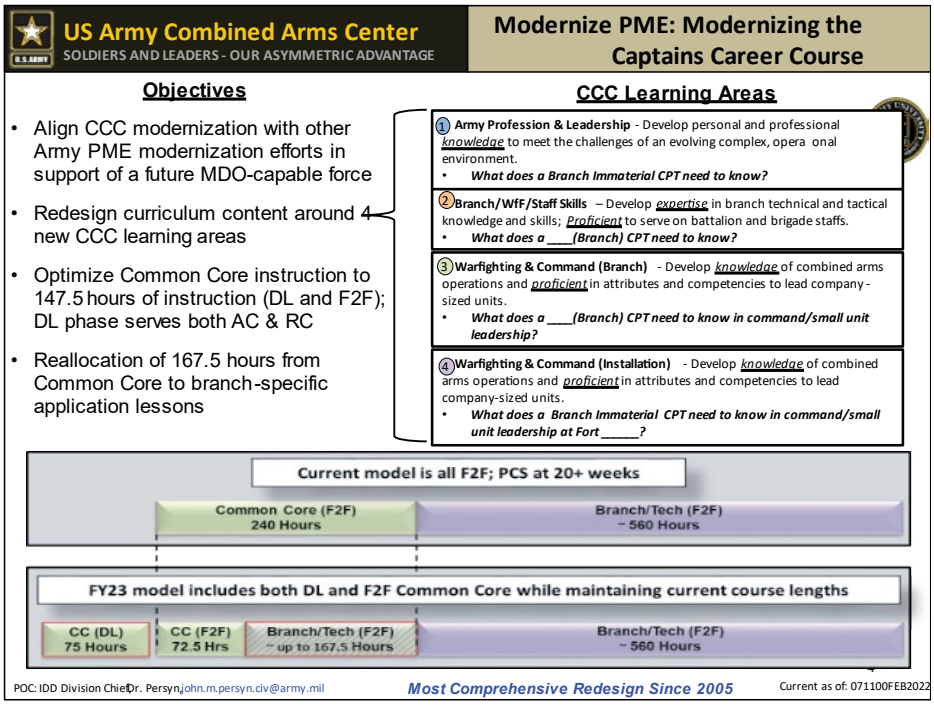
CAC initially set CCC modernization for complete implementation in FY24 (VPAA, 2021b, p. 9). By the second quarter of FY22, CAC set full implementation for the first quarter of FY23 (CAC, 2022, p. 3). This reduced time for developing updated learning products and further reduced the scope of the modernization effort. IDD analyzed and designed new learning products for submission to the identified contractor to develop the Captains Career Course common core C5 distance learning (DL) in four months. The identified contractor then had a shortened eight-month period of performance to develop C5 DL and test it before implementation via the Army Learning Management System on 1 October 2022. Schools and centers will have to develop face-to-face products to be delivered six months after, by 1 April 2023.

Evaluating the Modernized CCC

Changes to the scope and pace of CCC modernization affected the extent of modernization. FY23 CCC modernization focused mainly on technological infrastructure and design dimensions. The modernization process itself affected the commitment dimension. Dimensions of governance, policy, and human infrastructure

Figure 4

Captains Career Course Objectives, Learning Areas, and Redesign Model



From *CCC Modernization OPT 3 Executive Summary*, 2022, by J. M. Persyn. Army University.

remained untouched due to the refined scope and pace of the modernization effort. This section will assess the modernized CCC against the following three dimensions: technological infrastructure, design, and commitment.

FY23 CCC modernization directly impacted the technological infrastructure of the course. Combining asynchronous DL through the 75-hour C5 DL component and redesigned resident instruction resulted in a blended learning model for the FY23 CCC. Blended learning is the optimal learning modality for achieving CCC learning outcomes. Students who participate in blended learning environments improve their learning outcomes more than those who learn in online or face-to-face environments alone (Means et al., 2013, p. 29).

IDD designed C5 DL as 39 distinct but related CBI modules. These modules will be hosted on the Army Learning Management System beginning 1 October 2022. All 39 modules are Shareable Content Object Reference Model (SCORM) 2004 third edition compliant. SCORM is a technical standard for eLearning products

that enables interoperability between learning content and SCORM-compliant learning management systems. NCO Professional Development System Distributed Leader Course numbers I through VII use the same technological infrastructure (NCO Leadership Center of Excellence, n.d.). The pre-modernized CCC for Reserve Component officers also uses similar technological infrastructure.

FY23 CCC modernization resulted in an updated course design, as seen in Figure 4. VPAA coordinated with each school and center to review critical learning requirements during CCC modernization OPTs 3–5 (Persyn, 2021a, 2021b, 2021c). Course redesign resulted in a streamlined common core with optimized modalities depending on desired levels of learning for each lesson. Critical learning requirements reviews aligned C5 learning objectives to four new CCC learning areas (see Figure 4). IDD reduced C5 length from 240 hours to 147.5 by combining requirements, adjusting required proficiency levels, and removing redundant or outdated learning content. IDD identified 75 hours of the reduced 147.5 hours for DL development as 39 CBI-based lessons. IDD maintained the remaining 72.5 hours as face-to-face C5 lessons.

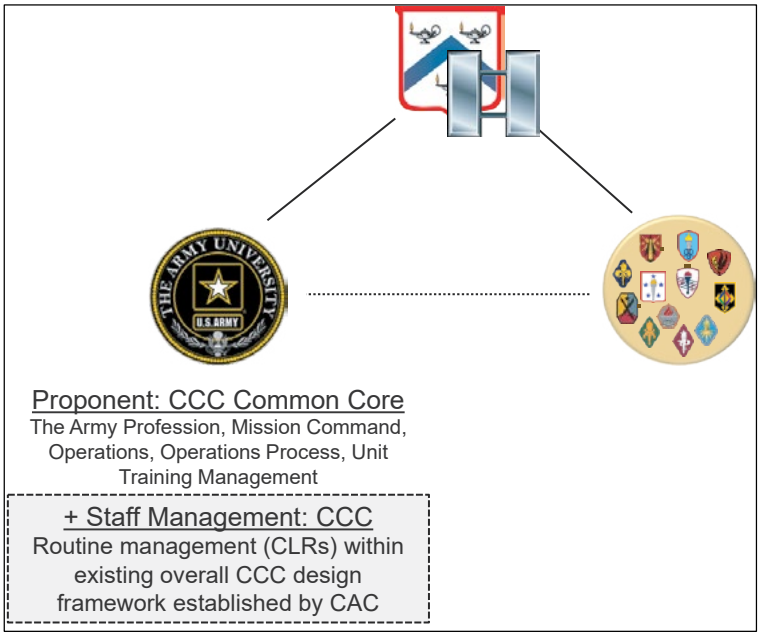
Schools and centers conducted independent reviews of branch-specific CCC content. The pre-modernized CCC model allocated up to 560 hours for branch-specific CCC instruction. Army University identified up to 167.5 additional hours for each school and center for branch-specific education in residence. As of 7 September 2022, schools and centers were still developing the specifics of their modernized resident CCC for implementation. The intended result of allocating 167.5 additional hours in resident instruction to each school and center is for students to become experts in their branch.

FY23 CCC modernization indirectly affected the dimension of commitment. Implementation of CCC modernization at scale required constant coordination throughout the enterprise. Much of this coordination involved partnerships that would be unnecessary during routine curriculum updates. This coordination increased awareness of CCC modernization and the role of VPAA, Army University, and CAC in educational modernization initiatives. A shared vision was developed and agreed to during design of the CCC modernization effort in FY22 (Lequire et al., 2021, p. 2). VPAA, the Office of Primary Responsibility for FY23 CCC modernization efforts, grew commitment to the shared vision by including the Army learning enterprise and critical institutional and operational partners to monthly OPT sessions, biweekly VPAA CCC modernization updates, and monthly telephone conferences.

Modernization did not affect governance, policy, or human infrastructure dimensions. Based on guidance from the November 2021 Training and Doctrine Command Education Summit (Dillon, 2021, p. 3), CAC directed implementation of CCC modernization in FY23 instead of full implementation in FY24 (CAC, 2022, p. 3). New guidance resulted in an expedited development timeline for C5

Figure 5

Proponency and Staff Management Functions for the Captains Career Course



DL of less than nine months. The new timeline also included obtaining necessary resourcing for C5 DL development through an unfunded request for over $2 million through CAC. Army University's necessary focus on C5 DL development led to deliberate improvement in technical infrastructure, design, and commitment without change to the remaining dimensions of the future learning ecosystem.

Future Opportunities for Modernization

Modernization is a continuous process (DA, 2019, p. 1); it is misleading to frame FY23 modernization initiatives for CCC as complete or final. Instead, we should frame FY23 modernization initiatives as a part of an ongoing campaign for educational modernization. The remainder of this article outlines possible directions for FY24 CCC modernization initiatives and beyond.

Technological infrastructure for the modernized CCC can evolve in two distinct ways. The first way is by shifting toward ADL Initiative's cmi5 specification. Cmi5 is the latest instantiation of eLearning standards. It expands on the Experience

API (xAPI) standard and provides SCORM-like capability for eLearning products that must interface with various learning management systems (Army Distributive Learning Initiative, 2021, p. 5). Using cmi5 will enable comprehensive data collection of learner interactions and allow learning professionals to conduct fuller analysis based on actual learner experience data. Additionally, it will ensure that learning products remain technically viable over a more extended period. Future iterations of the Army's learning management solution, such as the Army Training Information System (TPO Army Training Information System, n.d.), should be capable of hosting cmi5 compliant courseware.

The second direction for modernizing technological infrastructure is to enable social learning experiences. Social learning "is collaborating with others to make sense of information and to create new ideas" (Craig et al., 2020, p. 117) and has the potential to increase engagement and improve student abilities to apply, analyze, and synthesize knowledge in a collaborative environment (Kimball & Byerly, 2013, pp. 1, 33). Unfortunately, students completing C5 DL CBI modules designed for FY23 will not have any feedback or interactions with either an instructor or their fellow students. Future modernization initiatives can work toward creating a fully blended learning environment that provides social scaffolding and enables social learning throughout C5 DL. Integrating synchronous and asynchronous virtual learning technologies into the Army's next learning management system is key to enabling these social learning experiences.

Army University should continue to grow in-house DL development capabilities to update C5 DL in response to rapidly changing doctrine. VPAA's Faculty and Staff Development Division is growing this capability internally. This capability should expand to ensure IDD can rapidly update and eventually create new C5 DL learning products without reliance on contracted capability. Untethering development cycles to the FY is critical to increasing responsiveness to the rapidly changing operational environment while reducing costs. Training developers should be proficient in designing face-to-face and DL-specific lesson authoring tools such as Adobe Captivate or Articulate Storyline 360 to meet captains' educational needs.

Army University should continue to work with enterprise partners to increase commitment to modernization efforts for FY24 and beyond. Most potentially impactful changes to the CCC have a scope, cost, and time horizon that will require increasing levels of commitment from the Training and Doctrine Command; Human Resources Command; Headquarters, Department of the Army; and each Army school and center of excellence. Army University must build this commitment through frequent engagement and progress toward the common goal of increasing Army readiness.

Future modernization efforts should clarify governance procedures. Proponency for C5 and various branch-specific domains remains valid regarding learning content development. However, there is a gap in staff management of the entire CCC.

By default, staff management of CCC functions (see Figure 5) has also fallen to IDD. Army University, through CAC, should define the staff management function and work with schools and centers to refine critical processes. Defining the staff management function will result in streamlined integration of C5 learning products and synchronization of future modernization efforts.

Policy frames the extent of modernization possible for CCC. Changes to the Joint Travel Regulations are essential to meet the original intent to create tailorable and flexible paths for CCC attendance. Without this policy change, each course offering will be either PCS or TDY, with a break-even point of 14 weeks and four days between both options. A concerted effort to allow hybrid course offerings will open possibilities for flexible CCC attendance options during future modernization efforts.

Human infrastructure should be improved by continuing to develop talent needed to facilitate modernized instruction. Army University can facilitate this understanding in the short term by engaging educators across each school and center. In the midterm, small-group leaders across the institutional Army should be proficient in DL and resident instructional techniques. Organizations such as Army University's Vice Provost for Digital Education offered courses during the pandemic to facilitate expertise in distributed learning. A similar course should be provided to small-group leaders to posture them to maximize student learning regardless of modality.

Conclusion

FY23 CCC modernization efforts aligned technological infrastructure and design of the course closer to the ideal future learning ecosystem. However, modernization is a continual process, and significant opportunities remain to modernize across all six dimensions of the future learning ecosystem. With thorough analysis, a thoughtful approach, and energetic implementation, continued modernization in these directions may reap further benefits to the readiness and cognitive development of the Army's junior officers.

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iFEST 2022 Summary

The Innovation, Instruction, and Implementation in Federal e-Learning Science & Technology (iFEST) Conference is an ideal conference to keep training and education organizations up to date on the state-of-the-art learning practices and procedures related to learning with technology. The conference is "the premier conference on distributed learning, bringing together thought leaders, innovators, and senior officials from government, industry, and academia to collaborate and share the latest challenges and innovations in the field" (Advanced Distributed Learning Initiative, 2021). The conference first started in 2003, and the 2022 iFEST was the 19th successful annual conference. The conference is jointly organized by the National Training and Simulation Association and the Advanced Distributed Learning Initiative. It is normally held around the end of August or early September. The conference offers innovative keynote talks, panel sessions, interactive activities, exhibits by industry, and talks from individual presenters. Topic areas include digital learning science, learning technology, learning data, technology interoperability, policy, and a timely topic that changes annually such as training and learning in the new normal.

In 2022, the conference returned to an in-person event held in Washington, D.C. The conference had attendees that spanned the public, private, nonprofit, and academic sectors. The bulk of the attendees were from the federal government/military backgrounds, who received free attendance to the conference. This year's keynote speakers were Shawnna Hoffman, chief technology leader, legal strategy, and operations for Dell Technologies; and Beverly J. Seay, southeast regional director for the National Security Innovation Network (Advanced Distributed Learning Initiative, 2022). The 2022 conference included 45 individual talks and 13 poster presentations covering cutting-edge best practices, examples, and research on the aforementioned topics.

We present four papers as examples from the conference. The current special issue solicited submissions from the accepted talks and posters. Submitted papers were independently peer reviewed by members of the *Journal of Military Learning*. Craig et al.'s paper (2023) presents an empirical evaluation of the PERvasive Learning System, which shows evidence for real-world impact in an Army schoolhouse. Goodell and Schatz (2023) provide a high-level overview of the transdisciplinary area of learning engineering, which combines the science of learning, systems engineering, and human-centered design areas to build learning systems that work with learners. Rude (2023) provides best practices for learning ecosystems to foster distributed learning focusing on forming the stakeholder ecosystem, assessing stakeholder relationship health, and maintaining stakeholder networks. Kurzweil et al. (2023) provides an overview of best practices for fostering partnerships that can support distributed learning within military education.

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Peer Reviewed

Investigating the Impact of Mobile Microlearning and Self-Regulated Learning Support on Soldiers' Self-Efficacy and Retention within an Army Schoolhouse

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Abstract

The current study has shown positive evidence for the adoption of the PERvasive Learning System (PERLS) into military education and training environments. A randomized control trial was implemented to evaluate the impact of PERLS within a military classroom setting. It found that PERLS use during a course could improve soldiers' self-efficacy for content and self-regulated learning (SRL) and potentially increase completion rates for soldiers. These findings show the possibility that correctly designed technology can support users' self-efficacy for their ability to implement SRL. Further, this study

has shown that microlearning technology with SRL support, as seen in PERLS, has the potential for real-world classroom impact.

To address the training needs of the next generation of soldiers, the U.S. Army requires a systematic approach to incorporating formal and informal learning experiences into training and development. This approach is described in *The U.S. Army Learning Concept for Training and Education* (U.S. Department of the Army, 2017). In this doctrine, Army training leadership describes an adaptive, personalized, and learner-centric learning environment. To support this emerging approach, modern instructional design approaches and technologies must be successfully integrated into existing schoolhouse curricula.

One such approach is self-regulated learning (SRL). SRL is a process that trains learners to form skills (Zimmerman et al., 2002) and habits (Butler, 2002) that support the act of learning such as goal setting, self-monitoring, and adapting to performance (Harris & Graham, 1999; Schunk, 1996). The development of SRL abilities can lead to not just better achievement but also improved self-efficacy (Zimmerman et al., 2002). Self-efficacy is an individual's belief in his or her ability to perform actions needed to reach goals in a specific area (Bandura, 1986).

This article investigates the effectiveness of implementing learning tools to support SRL in a military classroom context. Specifically, the extent to which learning technology can support SRL and soldier self-efficacy and impact course performance was evaluated. To address this topic, the PERvasive Learning System (PERLS) was utilized. PERLS is a mobile-first learning technology platform designed specifically to incorporate modern instructional design approaches including mobile microlearning, SRL, and adaptive learning. Developed by the Advanced Distributed Learning (ADL) Initiative, PERLS was developed in part to support the U.S. military's broad efforts to modernize training through new technology platforms.

Microlearning

Microlearning is a learning approach based on small learning units and short-term, focused activities (Hug et al., 2006; Lindner, 2007). They are normally less than five minutes in length (Jahnke et al., 2020). This short but integrated method of learning has been increasing in popularity over recent years in both publication trends and internet searches (Leong et al., 2020) and has grown within the training industry (Taylor & Hung, 2022). There is evidence within the literature that microlearning can support retention of information (Taylor & Hung, 2022) and build confidence of students (Hesse et al., 2019; Pascual et al., 2018). The main recommended method of implementation is mobile. Presenting microlearning content on a personal smartphone or tablet takes advantage of opportunities for engagement outside the

classroom, which tend to be shorter than traditional courses. In addition, using mobile devices facilitates access to information at the point of need (Craig & Schroeder, 2020). Mobile microlearning has also been shown to improve student participation, achievement, and learning (Nikou & Economides, 2018; Suartama et al., 2019).

Self-Regulated Learning

The self-regulated learning theory decomposes learning processes into recursive phases that are enacted strategically and intentionally to improve performance (Alexander et al., 1998; Panadero, 2017; Winne, 2011; Winne & Hadwin, 2008). A task definition phase describes students' efforts to understand the pertinent problems and available resources. The general SRL cycle is to first engage in a goal setting and planning phase to establish objectives and select tools and strategies to meet those objectives. Next, an enactment or engagement phase describes how students implement and choose strategies as well as attempt to perform the task. Finally, in an evaluation or adaptation phase, students assess their actions and outcomes and make efforts to revise their goals, plans, and strategies.

In contrast with SRL-guided learning, when students are unguided (i.e., receive minimal strategy instruction or supporting scaffolds) within a system, they are typically poor

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at regulating their own learning (Winne, 2005); they overestimate their abilities (Kruger & Dunning, 1999) and content understanding (Glenberg et al., 1982). As a result, students without strong SRL strategies need additional scaffolds to guide them through the process. Without guidance, the student may flounder (Kirschner et al., 2006).

Existing studies have considered the role and assessment of metacognitive monitoring and regulation in learning from multimedia, hypermedia, and educational technology (e.g., Azevedo et al., 2010). Such studies consistently link self-regulatory strategies to improved learning and performance when studying in distributed multimedia environments. Moreover, these studies demonstrate how self-regulation strategies can be taught or encouraged through various scaffolds (e.g., Azevedo & Cromley, 2004) and have demonstrated interactions between self-regulation and cognitive factors (e.g., prior knowledge; Taub et al., 2014) and motivational factors (e.g., achievement goals; Duffy & Azevedo, 2015).

PERLS and PERLS Development

The PERLS platform is the culmination of several years of research and development aimed at addressing questions about the effectiveness of technology designed

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Wade R. Elmore received his PhD in psychology from the University of Missouri–Kansas City in 2014. Elmore began working with the Army Research Institute for Behavioral and Social Sciences as a student research fellow in 2011 and as a postdoctoral research fellow where he found a passion for civilian service in support of the soldiers of the U.S. Army. In his ten years working for the U.S. Army, Elmore has worked at the Center for Army Leadership, The Army University, and in 2021 joined the Cognitive Sciences and Applications Team of Combat Capability Development Command–Soldier Center. Elmore has contributed to the enterprise level understanding of Army leadership and Army professional military education using Army-wide surveys. Currently, Elmore is engaged in research examining the use of learning sciences best practices on military education and training, and the efficacy of applying these best practices in classroom instruction and through distributed asynchronous training and education platform, characterizing soldier-relevant cognitive and physical traits, and characterizing tactical performance during sustained live-fire exercises.

to support SRL (Craig, Barnard, et al., 2022; Freed et al., 2017; Udell, 2019, 2022). While research suggests SRL improves learning outcomes, it is not a process that learners often utilize on their own (Panadero et al., 2017). Consequently, tools that facilitate engagement in SRL are beneficial to its effectiveness (Azevedo, 2005; Barber et al., 2011; Persico & Steffens, 2017). Learners must learn how to execute SRL successfully and tools to enable that process are critical to its success.

PERLS is a government-owned, off-the-shelf product that uses advanced algorithms to provide tailored learning recommendations to learners based on their characteristics, learning history, training requirements, and context. PERLS was designed primarily for mobile learning use but also provides content through a web interface. PERLS has advanced from a research and development prototype on iOS without an authoring system (Freed et al., 2017) to a robust multifunction platform system capable of creating and distributing content, supporting learning and training organizations across the Department of Defense learning ecosystem (Craig, Barnard, et al., 2022; Udell, 2019, 2022). The system has been independently user-tested with both formative expert evaluations and summative user-based testing to ensure the system works as intended and is ready for transition into learning ecosystems. This has resulted in a learning technology system that is mobile, content-agnostic, stable and scalable, empirically validated, technically documented, and designed for transition to sustainment (Craig, Siegle, et al., 2022).

Instructional Methodologies in PERLS

PERLS was specifically designed to support modern instructional design approaches. What makes PERLS unique as a learning platform is the deliberate integration of features and functions that facilitate SRL, mobile microlearning, and adaptive learning into one application. For PERLS, a learning-science-based ap-

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proach drove the design of many of the functions of the software itself. Examples of this include extensive features that can support SRL (Roscoe & Craig, 2022). The system supports the planning phase of SRL through goal setting and topic selection. Planning is also enabled through search-and-discover (drill-down topics) features and a recommendation engine to support content identification. Enacting is supported by PERLS content cards (e.g., article cards, flip cards, and tip cards; see Figure 2 in Methods). The system supports reflecting exercises with the recommendation system using quiz cards and flip cards after content has been learned for reinforcement. The authoring tools in PERLS drive the content developer to create short-form content suitable for consumption on a mobile device. Instead of long-form articles, authors are supported in developing content cards to highlight key content elements, multimedia content such as videos, and learning support features such as quizzes and flashcards. These microlearning techniques allow for the learner to use PERLS for short periods of time, to supplement ongoing classroom work, and to find useful information at the point of need that can improve performance (Craig & Schroeder, 2020; Jahnke et al., 2020).

Current Study

The current study evaluates if PERLS can impact SRL, self-efficacy, and later behavior within an Army schoolhouse setting with active soldiers. Since the system is providing learning materials that support both microlearning principles and SRL, which have been shown to increase both perceptions of learning and increase learning, it is possible to make four hypotheses and testable predictions.

(H1) Use of PERLS would increase self-efficacy for materials being learned. In the current study, this would predict that soldiers who use PERLS would have higher self-efficacy for completing air assault tasks than soldiers in the study who did not use PERLS.

(H2) Because the system supports users in performing SRL behaviors, use of PERLS would increase self-efficacy for their ability to implement SRL. This would predict that soldiers who use PERLS would have higher self-efficacy for their ability to implement SRL strategies than soldiers in the study who did not use PERLS.

(H3) Because the system supports users in performing SRL behaviors, use of PERLS would increase the likelihood of implementing SRL behaviors. This would predict that soldiers who use PERLS would have report greater SRL behaviors than soldiers in the study who did not use PERLS.

(H4) Finally, the use of PERLS should increase performance within the learning setting that it is implemented. It is predicted that soldiers using PERLS would have a better completion rate due to better performance than soldiers who did not use PERLS.

Methods

Design and Setting

A randomized control trial was implemented to evaluate the usage and impact of PERLS within a military classroom setting. Participants were recruited among soldiers taking four classes at The Sabalauski Air Assault School (TSAAS). The TSAAS is an Army professional military education and training facility located in Fort Campbell, Kentucky. The schoolhouse prepares students for air insertion and air assault missions utilizing a fast-paced, and physically demanding 10-day course schedule. Students are given highly technical training from subject matter experts in both classroom and hands-on formats and tested under high-stress conditions. Due to the large amount and challenging nature of the subject material, and the requirement to rapidly apply learned material in a high-stress testing situation, air assault schools have notoriously high failure rates. However, if the student performs all required tasks to standard, she or he graduates and is certified to perform air assault tasks upon return to the operational unit.

The Air Assault Course consists of three phases of roughly three days each. Phase 1 introduces soldiers to a wide variety of basic air assault topics (e.g., facts about rotary-wing aircraft, medical evacuation, hand-arm signaling). Phase 2 involves learning how to inspect the rigging of cargo attached to rotary-wing aircraft for errors that would endanger in-flight operations. Phase 3 teaches soldiers how to rappel out of rotary-wing aircraft. At each phase, soldiers must pass both a 50-item multiple-choice test and hands-on test activities to proceed to the next phase of the course. Discussions with Air Assault Course instructors and staff identified three areas to be targeted in the project: (1) Phase 1 lecture content, (2) Phase 2 lecture content, and (3) Phase 2 hands-on training. A performance of 70% correct on a multiple-choice class assessment was necessary to pass each phase. Additionally, passing the Phase 2 hands-on test involved identifying three of four rigging errors on each of four different types of cargo loads in under two minutes each. If soldiers failed any of their tests, they were given an additional chance to pass. Notably, of the four cargo loads that soldier must learn to inspect, one of them was the most challenging and accounted for most of the Phase 2 failures (the A22 Cargo Bag). We included content in PERLS that targeted A22 Cargo Bag inspection specifically and did not include information on the other loads.

At the start of each class, the research team recruited learners in the class, collected their consent, identified pretest data, and applied the preset randomization scheme to place participants into conditions (Control or PERLS). Soldiers in the Control condition received their TSAAS course as normal with some additional material on resilience and an overview of self-regulation. Soldiers assigned to the PERLS condition were given a link and instructions on how to access PERLS in addition

to receiving their standard TSAAS course. All participants were contacted via email at the end of Phase 1 and Phase 2 to complete posttest measures. The data from this article is part of the data collected from the larger study.

Participants

This study recruited 441 soldiers from four classes. A total of 16 participants were removed from analysis; five due to retaking the course or being assigned to another and 11 for dropping out of the class before any data was collected. This resulted in 425 soldiers participating in the final study. These soldiers were randomly assigned to either the PERLS condition (standard classroom with PERLS support) or the Control condition (classroom + SRL and resilience training). This resulted in 215 soldiers assigned to PERLS (PERLS condition) and 210 soldiers assigned to classroom comparison condition (Control condition). However, there were treatment adherence issues in the study with soldiers not complying with their assigned conditions. Thirty-four soldiers assigned to the Control condition signed up for PERLS accounts (it should be noted that only eighteen of the 34 used PERLS), which resulted in 192 remaining from the original assignment. Additionally, of the 215 soldiers assigned to the PERLS condition, only 87 used PERLS during the study with 128 never opening PERLS. Because of this treatment adherence effect in the data, conditions based on treatment dosage were deemed more appropriate for answering the research questions. This resulted in 320 (192+128) soldiers who did not use PERLS (New Control condition) and 105 (87+18) soldiers that used PERLS (New PERLS condition).

Independent *t*-test results confirmed that the PERLS and Control group had similar demographics. There were no statistically significant differences between the groups in rank, education, or time in service. Further, there were no differences in participants' perceptions of the usefulness or familiarity with traditional formal instructional methods or informal instructional methods. The researchers concluded that these randomly assigned groups were comparable.

Additional treatment adherence problems occurred during posttest with many participants not completing the out-of-class posttest measures. Only 25 participants completed both pretest and posttest measures to be included in these analyses.

Materials/Content

PERLS Condition. For the PERLS condition, participants interacted with PERLS as an add-on to their air assault training. The PERLS content covered the material from Phase 1 and 2 of the course. The content was created by the ASU team using TSAAS class PowerPoint charts, instructor guidance packets for each topic, and the course handbook. All content was vetted by ADL Initiative instructional designers and TSAAS instructors from Fort Campbell.

Content Design. The content was created to use all aspects of PERLS, including article cards, flashcards, tip cards, two 100-item self-assessment tests, and the TSAAS handbook divided up into subsections (see Figure 2 for examples). All content in PERLS was created based on TSAAS content that was also available to soldiers taking the class. So, this condition was informationally equivalent to the Control condition. PERLS content was created following best practices based on science of learning recommendations (Craig & Schroeder, 2020). Examples of these include using deep-level multiple-choice questions with immediate feedback, reinforcement learning with flashcards, as well as articles that have visual organizers and links to provide contiguity for learning and short amounts of bite-sized information (Craig et al., 2020; Jahnke et al., 2020).

Control Condition. For the Control condition, participants took their class as normal. They were also provided additional training material on resilience and self-regulated learning. This content was identical to the content provided to students within the PERLS condition. However, it was provided as a supplemental online document. All interaction within this condition was between the participant and human instructors.

Self-Efficacy Assessment. A modified version of the General Self-Efficacy Scale (Chen et al., 2001) was used for this study at pre- and posttest to determine soldiers' self-efficacy. This test has eight items and is measured on a five-point scale (Strongly Disagree, Disagree, Slightly Agree, Agree, and Strongly Agree). One version of the scale was modified to assess soldiers' self-efficacy regarding their self-regulation abilities. A second version of the scale was modified to assess soldiers' self-efficacy with respect to their ability to perform air assault tasks (for the modified scale, see Craig, Siegle et al., 2022, Appendix). Both measures were given at pretest and posttest.

Self-Regulated Learning Measure. A version of the Kocdar et al. (2018) Self-Regulated Learning Measure was implemented to detect learners' self-regulation behaviors at pretest and posttest. This assessment has a total of 30 questions across five subscales: Goal Setting (5), Help Seeking (9), Self-Study Strategies (8), Managing Physical Environment (6), and Effort Regulation (2). This measure uses a five-point scale: Strongly Disagree, Disagree, Slightly Agree, Agree, and Strongly Agree.

Soldier Course Completion. Course completion was defined as a participant starting the class, consenting to participate in the study, and completing the course at the end of Phase 2 as indicated by the schoolhouse.

Procedure

Soldiers were recruited using a short in-person presentation within classrooms. Each soldier was given a research packet that included a consent form, initial instructions, a pretest knowledge measure, pretest version of the self-efficacy scales, pretest version of the SRL scale, and an instruction page on next steps depending on

Table 1
Means, Standard Deviation, and N for Posttest Self-Efficacy for Air Assault by Usage Condition

Condition	*M*	*SD*	*N*
Control	3.70	0.45	12
PERLS	4.39	0.62	13
Total	4.06	0.64	25

their condition. Soldiers in the PERLS conditions were given instructions on downloading and creating an account in PERLS. Soldiers in the Control condition received a link to two PowerPoint files on self-regulated learning and resiliency. It was up to participants to follow links and instructions provided. The day before the final test in Phase 1, all participants were contacted via email with a link to Phase 1 self-efficacy assessments. The participating soldier was contacted again via email the day before the Phase 2 assessment.

Results

Self-Efficacy for Air Assault Tasks

An analysis of covariance (ANCOVA) was conducted on soldiers' post training self-efficacy for air assault task ability using pretest self-efficacy measures for air assault tasks as covariates to determine any difference between condition and classes. This test indicated a significant difference for PERLS usage, $\mathcal{F}(1, 16) = 5.48$, $p = .03$; $\eta p^2 = .26$, but not for class or the interaction. Soldiers that interacted with PERLS ($\mathcal{M} = 4.39$, $\mathcal{SD} = .62$) had significantly higher self-efficacy than soldiers that did not interact with PERLS ($\mathcal{M} = 3.70$, $\mathcal{SD} = .45$) (see Table 1).

Self-Efficacy for Self-Regulated Learning

An ANCOVA was conducted on soldiers' posttraining self-efficacy for SRL ability using pretest self-efficacy measures for SRL as covariates to determine any difference between conditions. This test indicated a significant difference between PERLS and Control groups, $\mathcal{F}(1, 16) = 6.16$, $p = .02$; $\eta p^2 = .28$. Soldiers that interacted with PERLS ($\mathcal{M} = 4.13$, $\mathcal{SD} = .63$) had significantly higher self-efficacy than soldiers that did not interact with PERLS ($\mathcal{M} = 3.62$, $\mathcal{SD} = .55$) (see Table 2).

Table 2
Means, Standard Deviation, and N for Posttest Self-Efficacy for SRL by Usage Condition

Condition	*M*	*SD*	*N*
Control	3.62	.55	7
PERLS	4.13	.63	18
Total	3.98	.64	25

Self-Reported SRL Behaviors

A series of ANCOVAs were conducted on participants' reported self-regulated learning ability and on the five subscales for the SRL measure using corresponding pretest measures as covariates to determine any difference between PERLS usage conditions and classes. This test did not indicate any significant differences. The pre- to post-measures were generally in favor of slight improvement for the PERLS condition. While the effect size was generally small to medium, it is possible that the nonsignificant effect is due to small sample size. Additionally, it should be noted that these means and the results could be biased due to the low sample size and attrition.

Student Retention

A one-tailed *t*-test was conducted on soldiers' completion rates to determine differences between PERLS usage conditions. The variances between groups were not equal, so a corrected model was used to interpret the data. This test indicated a significant difference, $t(224) = 5.08$, $p = .001$, $d = 0.51$. Soldiers who interacted with PERLS ($\mathcal{M} = .18$, $\mathcal{SD} = .39$) had significantly more retention than the Control condition ($\mathcal{M} = .42$, $\mathcal{SD} = .49$). The means roughly indicate the proportion of soldiers who did not finish the course within the specific condition. This analysis shows that participants that used PERLS dropped the course at half the rate of participants that did not use PERLS.

Discussion

Overall, the combination of a mobile microlearning system with support for SRL processes as seen within PERLS had a positive impact on soldiers' perceptions and completion rates and generally supported our hypotheses. Our first hypothesis (H1) that use of PERLS would support soldiers' self-efficacy for air assault tasks was sup-

Table 3
Means, Standard Deviation, N, and Standard Error for Student Failure to Complete

Condition	*N*	*M*	*SD*	*SEM*
Control	320	.42	.494	.028
PERLS	105	.18	.387	.038

Note. SEM = standard error of the mean.

ported. Our second and third hypotheses regarding the use of PERLS supporting soldiers SRL received mixed results with reported self-efficacy for SRL showing increases (H2) but reported SRL behavior not showing increased (H3) compared to controls. Our final hypothesis on classroom impact (H4) was also supported with increased completion rates for soldier using PERLS.

The discrepancy in SRL findings could be explained by the short duration of the implementation. Self-efficacy is a person's belief in their ability to perform a behavior or set of behaviors (Bandura, 1977, 1986, 1997). Self-efficacy has been shown to directly impact motivation that leads to skill transfer (Chiaburu & Marinova, 2005). Elevated self-efficacy increases the intent to perform the learned skills so that the next step of doing is initiated (Machin & Fogarty, 1997). However, the sensitivity of the self-regulation behaviors measure used in the current study may have been impacted by the limited scope of the evaluation. The measure was designed to assess long-term changes in learning behavior, while our study was constrained to the context of one course. So, it is possible that the scale was not sensitive enough to capture fine grained changes from within the course. Future research investigating the longer lasting impacts of the intervention on SRL behavior would be required to determine the extent to which substantial changes to SRL behaviors would result from using PERLS.

Improving Classroom Completion Rates with PERLS

The study shows that soldiers using PERLS completed the course at significantly higher rates than those that did not. In interpreting this finding, consideration is needed of the treatment adherence effect in that many participants assigned to use PERLS did not use it due to unknown reasons. This was perhaps due to the short duration of the course with a high amount of optional content and PERLS as part of the class. While pretest data indicate that the treatment adherence problem was random without any statistical differences between Control, PERLS, and the original

groups with the treatment adherence problems, it is always possible that there was another systematic factor that we could not identify. However, this does not seem highly plausible due to the similar pretest findings. Additionally, the current findings align with the previous research on learning technologies (Foster & Fletcher, 2002), microlearning systems (Jahnke et al., 2020; Nikou & Economides, 2018), SRL support systems (Azevedo et al., 2010), and other findings with the current PERLS (Craig, Siegle, et al., 2022), all of which have consistently been shown to increase learning. However, the use rate within the PERLS condition of 40% highlights the need to better understand soldier hesitancy in adoption of learning technology and what might increase use rates of learning technology.

Our evaluation found that PERLS was an effective system that was generally viewed as helpful by users and instructors who would recommend reuse within the course. This finding also aligns well with some of our qualitative findings (Craig, Barnard, et al., 2022). Soldier interviews pointed toward the successful use of PERLS during the class. Interviews with instructors did not report any negative impacts, increased disruption, or increased instructor burden from the implementation of PERLS.

While the increase in completion rates seems promising, the return on investment should be examined for courses before adoption, as the manpower required to develop and maintain course content within PERLS is significant. The Cadre of TSAAS were not asked to create the materials used in this evaluation, so the ability for these instructors to create content within PERLS is unknown and additional attention and research should focus on the interface and usability of the system for content creation and maintenance.

PERLS' Broader Potential Impact

The *U.S. Army Learning Concept* (U.S. Department of the Army, 2017) recognizes a need for mobile microlearning as part of a larger learning ecosystem, with the ability to adapt to shifting educational demands of the individual. The current study has shown positive evidence for the adoption of PERLS into military education and training environments. The convenience of having on-demand training materials available in an online application allows soldiers to study wherever and whenever they can fit it into their busy training schedules. PERLS provides immediate feedback to the learner about their current knowledge on a subject, providing a tailored approach to learning soldiers are unable to receive through individual handbook study alone. Web or application-based microlearning solutions, like PERLS, may provide postgraduation access to the software for soldiers to review important materials after they return to their rotational units, allowing them reach back capability, increase their knowledge retention duration, and remain subject-matter experts in applied operational environments.

Conclusions

The current study has shown positive evidence for the adoption of PERLS into military education and training environments. It found that PERLS use during a course could (1) improve soldiers' self-efficacy for both content and SRL and (2) potentially increase retention/completion rates for soldiers. SRL has notoriously been difficult to instill without intense training (Winne, 2005), and these findings show the possibility that correctly designed technology can support user's self-efficacy for their ability to implement SRL without explicit instruction. Further, this study has shown that technology that combined SRL support with a microlearning platform, as seen in PERLS, has the potential for real-world impact within classrooms.

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Peer Reviewed

Learning Engineering at a Glance

Based on the iFEST Poster (Winner of Best Poster Design)

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Abstract

Engineering has been successfully applied to many complex human-centered challenges. This article proposes learning engineering to transform military learning at the pace and scale needed to respond to the growing complexity of the global security environment. It is based on the award-winning "Learning Engineering at a Glance" poster presented at the Innovation, Instruction, and Implementation in Federal E-Learning Science & Technology Conference, the premier conference on distributed learning.

Do you feel uncomfortable when the words "learning" and "engineering" are used together? If you do and your background is in education, education research, instructional design, or one of the disciplines investigating the science of learning, then you have peers who have similar feelings. However, this should not be the case because these communities of inquiry and practice are not at odds with the emerging process and practice called learning engineering. Learning scientists and instructional designers alike have questioned whether "learning engineering" is just a new label on what they already do. Many people are uneasy because they associate the word "engineering" with work that is cold and mechanical compared to the very human process of learning, which happens uniquely within the mind of a learner, not something done to learners.

The IEEE IC Industry Consortium on Learning Engineering (ICICLE) attempts to take a more learner-focused approach by defining learning engineering as follows:

> Learning engineering is a **process** and practice that applies the learning sciences using **human-centered engineering** design methodologies and **data informed** decision-making to support learners and their development. (IEEE ICICLE, 2019)

Furthermore, ICICLE recognizes learning engineering as an iterative process that requires multiple cycles of creation, implementation, and investigation, most often by an interdisciplinary team rather than an independent learning engineer.

The purpose of this article is to raise levels of comfort with the notion of learning engineering, and levels of understanding about why engineering *for* learning is needed in military education and training. The book *Learning Engineering Toolkit: Evidence-Based Practices from the Learning Sciences, Instructional Design, and Beyond* (Goodell & Kolodner, 2023) makes the case for learning engineering as a distinct, professional practice that complements related professions and fields of study. The *Learning Engineering Toolkit* uses a story from another distinctly human field, medicine, to make this case. The following is a paraphrase of that story (Goodell, 2022): The lives of countless soldiers were saved during and since World War II based on the 1928 discovery of penicillin. Throughout history, the major killer in wars was infection rather than battlefield injuries. In World War I, the death rate from bacterial pneumonia was 18 percent; in World War II, it fell to less than 1 percent. However, at the beginning of the war there wasn't enough penicillin to fully treat a single patient (Wood, 2010). It took the work of chemical engineers like Margaret Hutchinson Rousseau and Jasper H. Kane to create a deep-tank fermentation process that made it possible for the United States to produce 2.3 million doses in time for the invasion of Normandy in the spring of 1944. As illustrated in Figure 1 and described in *Learning Engineering Toolkit* (Goodell & Kolodner, 2022), this story is a victory for both science and engineering.

This *engineered* process to scale production of penicillin is credited with helping to win World War II. Another kind of engineering, learning engineering, may prove critical for future victories.

The goals of science and engineering are different. The goal of science is to discover the truth about the world as it is. The goal of engineering is to create scalable solutions to problems using science as one tool in that endeavor.

Just like the need to scale the production of penicillin, there are learning sciences discoveries yet to be enabled at scale. The capability of our military personnel is at a disadvantage if the learning sciences cannot be applied at the requisite breath, pace, and efficiency. Learning engineering is needed.

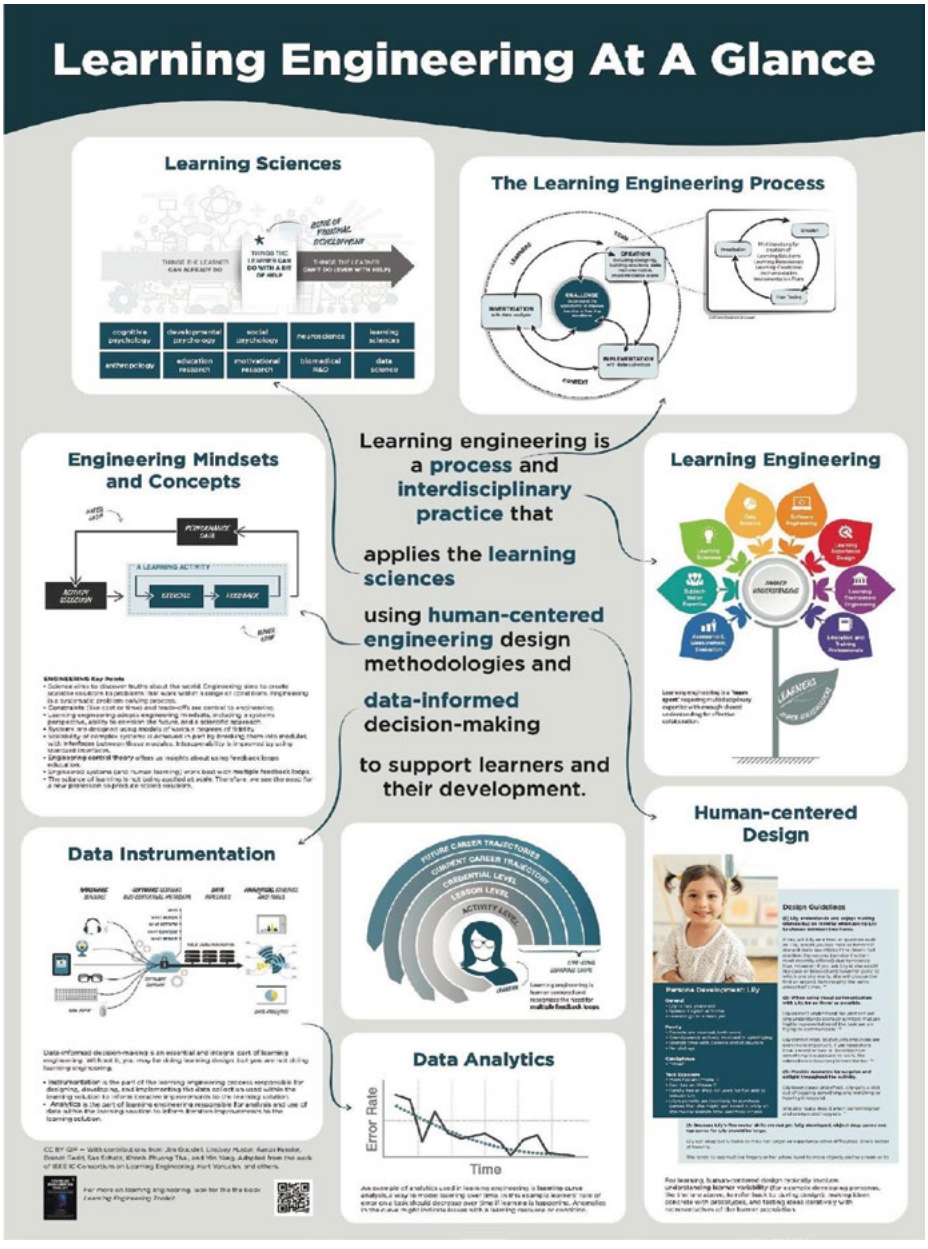
Figure 1
Penicillin Saves Soldiers' Lives Poster

From Science History Institute, Wikimedia Commons (https://commons.wikimedia.org/wiki/File:Penicillin_poster_5.40.tif). In the public domain.

Figure 2 shows "Learning Engineering at a Glance," a poster presented at the Advanced Distributed Learning's Innovation, Instruction, and Implementation in Federal E-Learning Science & Technology Conference in August 2022; it defines learning engineering and its foundational concepts.

Figure 2

Learning Engineering at a Glance Poster



By QIP with contributions from J. Goodell, L. Huster, A. Kessler, B. Redd, S. Schatz, K.-P. Thai, and M. Yang. Adapted from the work of IEEE IC Consortium on Learning Engineering, Kurt VanLehn et al.

The following sections each briefly describe a core characteristic of learning engineering, from its disciplined and iterative process to its inclusion of the learning sciences and data-driven methods. These features are what distinguish learning engineering from more traditional instructional design approaches.

Learning Engineering Is a Process

Learning engineering is more of a verb than a noun; it is more about what interdisciplinary teams of people *dσ* than a job title for one person.

A process defines how work is done. Processes have inputs, process steps, and outputs. The learning engineering process, as shown in Figure 3, can be generalized: it starts with understanding the challenge within a context, and then it includes cycles of creation, implementation, and investigation (Kessler et al., 2022) often considered concurrently. The process is iterative and includes multiple passes. Design of learning content or solutions that do not involve iterative cycles of improvement, guided by insights from data, cannot be considered learning engineering.

Challenges that need to be solved using the learning engineering process are often complex and require a multifaceted learning engineering team to address them.

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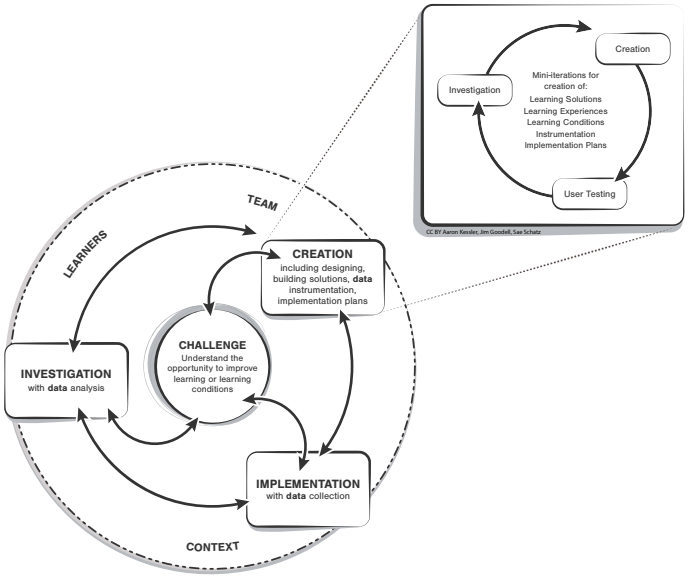
Figure 3

The Learning Engineering Process



After initially defining the challenge, the next step may be creation, implementation, or investigation. The problem to be solved in context may call for creation of a new learning experience, adjustments to the implementation of an existing learning solution, or additional data analyses as part of the investigation phase. The creation phase often involves mini iterations of creation, user testing, and investigation for the development of content, learning solutions, learning experiences, learning conditions (such as changes to an environment for more optimal outcomes), instrumentation (data collection infrastructure), and/or implementation plans.

While the generalized process is consistent, specific learning engineering processes used by a large team may vary from those used by a small team and the processes for developing one kind of experience (e.g., a field training exercise) may be different from those used for designing a different activity (such as a university curriculum).

Learning engineering challenges, as well as the processes used to address them, often have subchallenges or require subprocesses that need to be considered concurrently. Processing, analyzing, and interpreting the data from an implementation of a learning experience is necessary to inform the next iterative cycle of the learning engineering process.

Learning Engineering Applies the Sciences of Learning

Herb Simon (1967), who coined the term "learning engineering," wrote, "learning is a complex psychological process, and it would be naïve to think that anyone can design an effective learning environment and an effective program of learning experiences for students without a mastery of what is known, scientifically and practically, about that process" (p. 73).

Many different branches of science explore foundational understanding of learning and include studies having to do with how the brain and nervous system work from physiological and psychological perspectives along cognitive, behavioral, and motivational dimensions.

While it is beyond the scope of this article to attempt to cover the range of remarkable recent discoveries about how people learn (National Research Council, 2000; National Academies of Sciences, Engineering and Medicine, 2018), we recognize that with many of these discoveries—like the discovery of penicillin—a decade or more can pass without scaled application. The twenty-first century has been called the golden age for brain research (Chopra & Tanzi, 2021), based in part on the availability of technologies such as functional magnetic resonance imaging (fMRI). The opportunity to apply the findings from this golden age of research to military learning may depend on how well we can develop the practice of learning engineering.

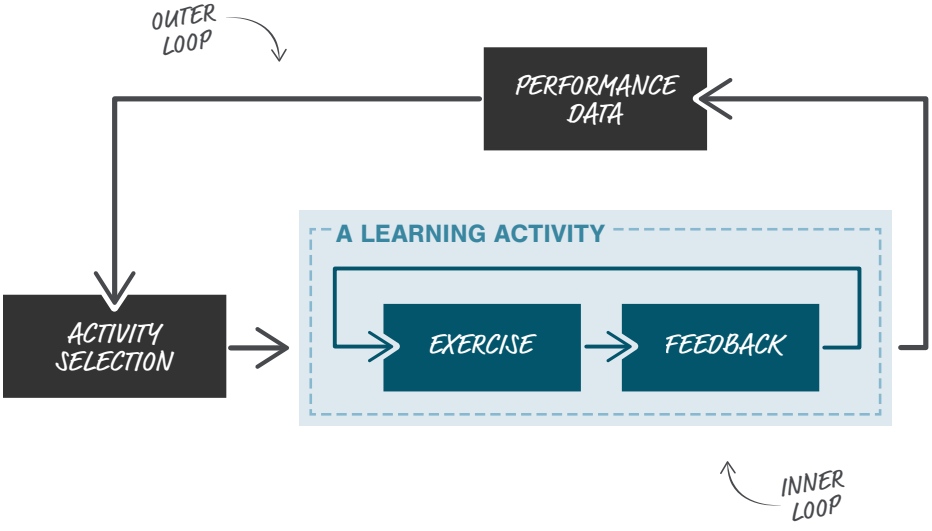
Learning Engineering Is Human-Centered

Learning engineering requires a human-centered focus. Human-centered design starts by understanding the challenge from the learners' perspectives and then creating solutions through research-based iterative design. Learning engineering's human-centered perspective has its roots in several fields including human-centered design, design thinking, universal design for learning, learning experience design, and design-based research (Thai et al., 2022).

Human-centered design is an iterative process that relies on data and data-driven decisions. For learning, human-centered design typically involves understanding learner variability; for example, developing personas to refer to during design, making ideas concrete with prototypes, and testing ideas iteratively with representatives of the learner population. The process can include the following (Thai et al., 2022):

- empathy development via observing or interacting with learners;
- codesign, or participation of learners in the design process;
- translation of ideas to rapid prototypes (e.g., design cards);
- testing ideas quickly with learners (for instance, to ensure the learners are meaningfully engaged, for sustainment of motivation and engagement, for feelings of being invited into the process, and for moving learning forward);

Figure 4
Engineering Control Theory Applied to Learning



From "Learning Engineering Is Engineering in Learning," by J. Goodell, J. Kolodner, and A. Kessler, *Learning Engineering Toolkit: Evidence-Based Practices from the Learning Sciences, Instructional Design, and Beyond*, p. 138, 2022 (https://doi.org/10.4324/9781003276579-6). Routledge.

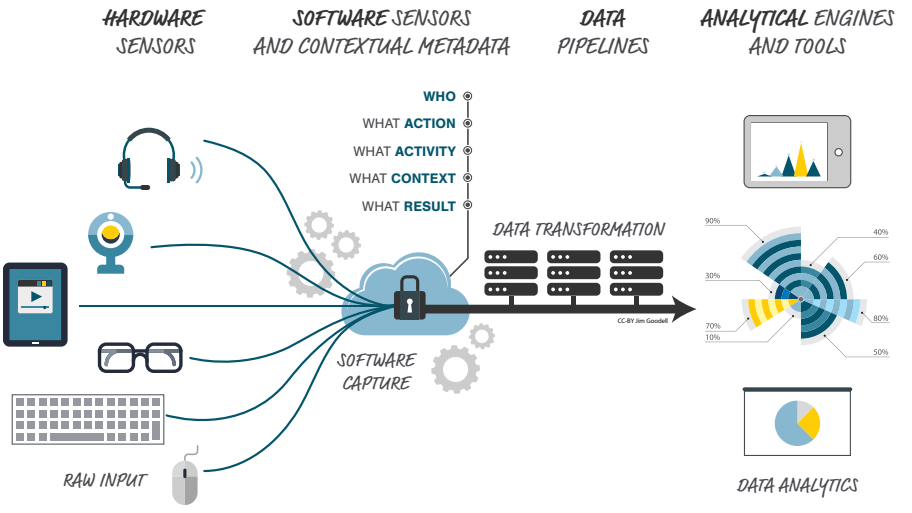
- iterative refinement with simple prototypes, which become more complex and developed with continued user input; and
- iterative refinement during implementation with continued user input.

A learning engineering team should be collectively focused on producing the outcomes from a learning experience by designing an effective set of conditions for learning rather than focusing on content or technology as their main product.

Learning Engineering Is Engineering

Engineering is the application of creativity and science to solve problems. Learning engineering is the application of the learning sciences to creatively solve problems for learners and learning. Engineering domains differ in the problems to be solved and in the science to be applied in solving them. Mechanical and chemical engineering apply sciences such as physics, material science, and chemistry, whereas

Figure 5
Data Instrumentation Pipeline



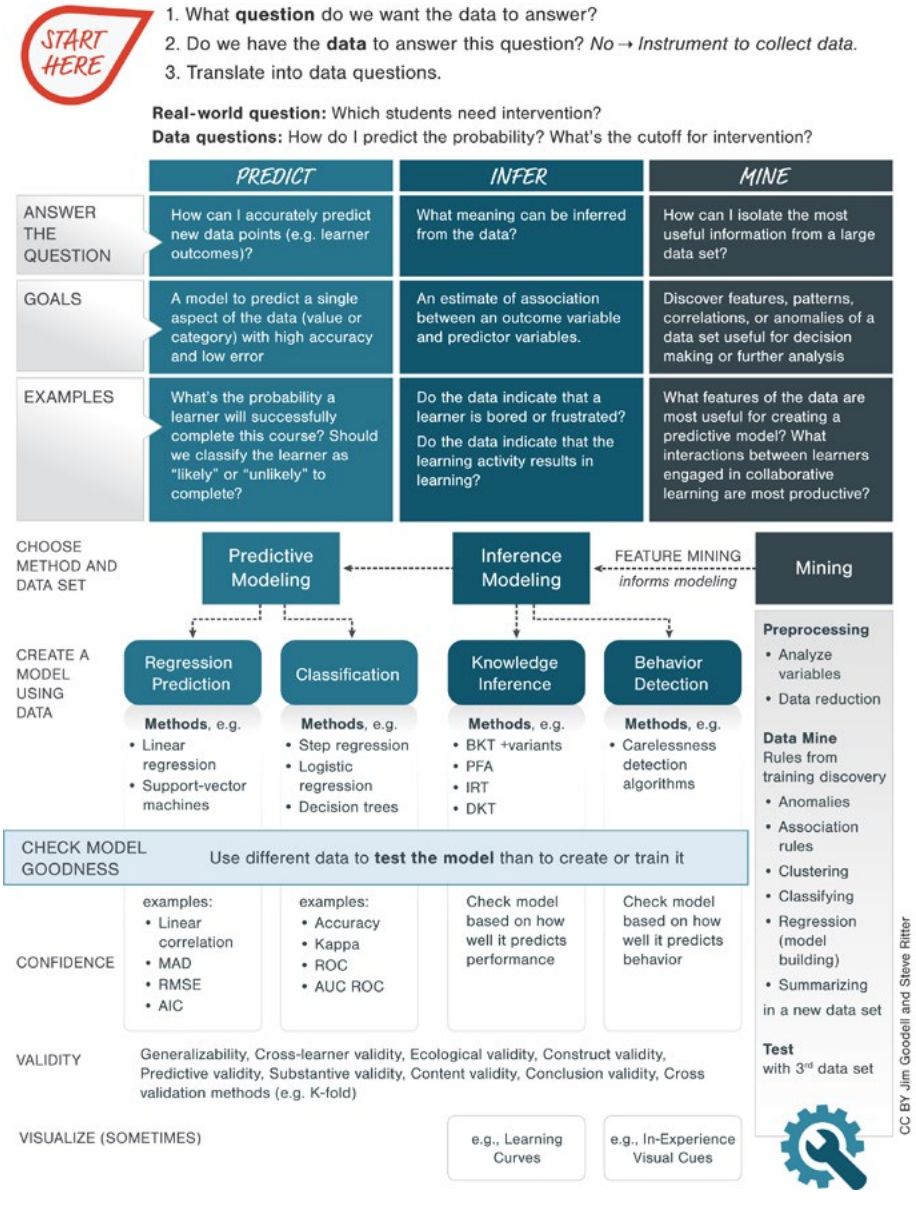
learning engineering applies, for example, cognitive, sociocultural, behavioral, and motivational sciences.

Each engineering domain is unique. There are, however, some overarching principles that apply to any kind of engineering. An engineering mindset is a systems mindset. Systems, whether learning systems, telecommunication systems, or pharmaceutical production processing systems, are designed using models of various degrees of fidelity. Scalability of complex systems is achieved in part by breaking them into modules, with interfaces between those modules. Interoperability is improved by using standard interfaces. Parts of a system have design constraints and tolerances (Barr et al., 2022).

Engineering control theory has relevance for learning engineering, as illustrated in Figure 4. Often, education systems are designed with open loop control systems that fail when the controller has an incomplete model of the learner, learning process, learning conditions or other factors.

In a closed-loop system, the controller compares feedback from the output to adjust the input. In learning engineering, the outputs (e.g., how well personnel are performing at a task) must be compared to the desired performance of the task. Faster, more frequent, and richer feedback is generally better, especially for dynamic systems, and can even compensate for less-than-ideal conditions in other parts of the system. Control systems use filters and dampers to prevent overcorrecting.

Figure 6
Learning Analytics Process Model



Engineered systems and human learning work best with multiple feedback loops. Subsystems may have their own feedback control loops.

Learning Engineering Uses Data

Data-informed decision-making is an integral part of learning engineering. Without it, you may be doing learning design, but you are not doing learning engineering (Czerwinski, Goodell, et al., 2022). Data-informed decision-making has two parts: instrumentation and analytics.

Instrumentation is the part of the learning engineering process responsible for designing, developing, and implementing the data collection used within the learning solution to inform iterative improvements to the learning solution.

Analytics is the part of learning engineering responsible for analysis and use of data within the learning solution to inform iterative improvements to the learning solution.

Instrumentation uses sensors to capture data along with software and hardware to process and store data for subsequent analysis, as illustrated in Figure 5. Sensors are human-computer or environment-computer interfaces that capture data.

Data-informed design decisions are needed because human intuitions about what helps people learn are often wrong. Looking at data from simple experimental trials can keep the work focused on the most important design features and avoid costly diversions. Experiments within learning engineering focus on uncovering highly contextualized findings within specific learning experiences, under specific conditions, or for specific populations.

Data analysis for learning engineering is a team sport, often requiring collaboration among psychometricians, learning designers, content and assessment developers, implementation consultants, user interface/user experience (UI/UX) designers, data scientists, software engineers, and product managers. Together, these teams often enable the generation of big data, which are extremely large data sets that may be analyzed computationally to reveal patterns, trends, and associations, especially relating to human behavior and interactions.

Of course, quantitative data does not always tell the whole story. Often, answers to qualitative questions about the conditions and context reveal what is happening. Learning is contextually situated and so are the results of any experimental data. So, learning engineering also embraces qualitative research approaches.

In learning engineering, data are sometimes used to model things about the learner, to predict a learner's state or behavior under given conditions, and to predict how well a given activity will bring about a particular learning outcome. Data can be used to question existing practices and assumptions.

The *Learning Engineering Toolkit* includes tools for data analysis such as the learning analytics process model (Czerwinski, Domadia, et al., 2022) shown in Figure 6.

Tools of the Trade

The learning engineering process calls for sets of tools and practices that themselves should be optimized through iterative and data-informed cycles of improvement. An initial set of tools in the *Learning Engineering Toolkit* address the following:

- tools for understanding the challenge
- tools from the learning sciences
- tools for teaming
- lean-agile development tools
- human-centered design tools
- data instrumentation tools
- software and technology standards as tools
- tools for learner motivation
- implementation tools
- ethical decision-making tools
- data analysis tools

Learning Engineering for Military Learning

Learning engineering is already underway in limited contexts within the U.S. military; for example, the Army's Synthetic Training Environment (STE) is a virtual training environment that brings together live and virtual training environments, aiming to deliver accessible exercises that mimic the full complexity of the physical world (Stone, 2021). STE development and implementation follows an iterative, multidisciplinary, learning engineering process that applies learning sciences using human-centered engineering design methodologies and data-informed decision-making. The STE with Experiential Learning for Readiness extends the Army's STE capability with persistent tracking of individual and team performance data to infer proficiency levels, identify strengths and weaknesses, and adaptively tailor coaching and remediation (Goldberg et al., 2021). The complexity of this system of systems is managed by applying principles of engineering, modularization with reusable components and standardized interfaces between systems and components.

Conclusion

The capability of our military personnel is at a disadvantage if the wealth of discoveries from the learning sciences cannot be applied at scale using human-centered engineering methodologies and optimized through a process of data-informed decision-making. "The future learning ecosystem—a holistic, lifelong, personalized

learning paradigm—represents a contrast to the Industrial Age model of time-focused, one-size-fits-all learning" (Walcutt & Schatz, 2019, p. 5). This new paradigm requires a complex continuum of data-driven, task-embedded, personalized, lifelong anywhere, anytime, learning. Engineering has been successfully applied to many other complex human-centered challenges. Learning engineering is a new strategic weapon in force readiness. Just as chemical engineering helped win World War II through scaled production of penicillin, learning engineering may help win the next war by optimizing the collective capacity of our forces.

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Peer Reviewed

Learning Ecosystems

Forging Stakeholder Partnerships to Fuel Optimal Advanced Distributed Learning Practices

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University of Louisville

Abstract

This article reflects a recent case study focused on creating a new learning ecosystem for microelectronics workforce development. In broad terms, this case study shed light on appreciating the critical need for learning ecosystems. For context, the need to attend to developing a robust and sustainable microelectronics workforce was fueled by creating, expanding, and nurturing continually learning partnerships among academia, industry, and government. Central to these learning partnerships was analyzing individual stakeholder needs, appreciating the unique contributions of stakeholders, and designing mutually beneficial learning solutions that built and fortified the ecosystem. Scholar and practitioner foundations are crucial for building and sustaining learning partnerships. The article shares best practices such as gathering and analyzing stakeholders, discerning intended value, and maturing the ecosystem. These practices can drive effective and learning-centric solutions that address complex issues facing our defense industrial base. Benefits to distributed learning include focusing prominently on the criticality of upfront and thoughtful analyses.

This best-practices article emanated from a session presented at the 16–18 August 2022 Federal e-Learning Science & Technology (iFEST) Conference in Alexandria, Virginia. The iFEST Conference theme, "New Paradigm of Learning: Partner and Prevail," was well-suited for exploring the learning ecosystem phenomenon in the context of microelectronics workforce development (Rude, 2022).[1] Sponsored by the Advanced Distributed Learning (ADL) network, iFEST en-

abled a thoughtful discussion on myriad partnering initiatives in the learning space. This article provides context for a learning ecosystem forged to address microelectronics, a national security concern. Then, social constructivism—the theoretical basis for this article—is addressed. Lastly, best practices concentrating on learning ecosystem stakeholders are explored.

Microelectronics Workforce Development Case Study

Developing the microelectronics workforce (ME WFD) is the case study that sparked the conference presentation and best practices addressed herein. The workforce is vast; according to the Semiconductor Industry Association (2021), "The U.S. semiconductor industry accounts for over a quarter of a million direct U.S. jobs and nearly 1.6 million additional indirect and induced U.S. jobs" (p. 21). Codified statute focuses on ME WFD activities such as experiential learning (Microelectronics Workforce Development Activities, 2022). The National Science and Technology Council (2022) issued a report in October 2022 that proffered two ecosystem-salient recommendations, "modernize career and technical education and … expand and disseminate new learning technologies and practices" (p. 13). A recurring theme is the need to reshore semiconductor capabilities and develop the industry's workforce, as cited by Shivakumar et al. (2022). The resultant ME WFD learning ecosystem was also coalesced to address a lack of diversity and educational opportunities in the larger science, technology, engineering, and mathematics (STEM) terrain. Data provided by the National Science Board (2022) yields disproportionate representation of minorities in STEM-related bachelor's and graduate degree programs. For instance, although Hispanics comprise 21.3% of the U.S. population aged 20–34, that demographic constitutes only 16.3% of bachelor's degree recipients, 12.3% of master's degree recipients, and 8.4% of doctoral degree recipients.

In several ways, the ME WFD learning ecosystem's evolution parallels the observation made by Walcutt and Schatz (2019): the imperative for an ecosystem orientation—one that harnesses the tremendous potential of its individual members and the collective—is fueled by the vast learning landscape, "now encompassing the full spectrum of formal, informal, and experiential training, education, and development" (p. 3). In that vein, Walcutt and Schatz (2019) portend that to an increasingly pervasive degree, learning demands competence in creating effective interdependencies, complexity, systems thinking, partnering, and collaborations. Engler and Pritzker (2018) recommended a reconfigured learning landscape, one that forges robust connections between education and employment. Educational venues were not limited to degree-granting institutions; vocational and trade schools that confer credentials were encouraged, as was the increased quality and transparency of cre-

dentialing programs. This research illuminated the need to broaden the aperture of educational stakeholders involved in ME WFD.

Another parallel related to ME WFD ecosystem stakeholders draws from the ADL initiative, authorized by the Department of Defense (DOD) Instruction 1322.26, *Distributed Learning* (Kurta, 2017). As noted therein, the policy refers to imperatives such as the following:

- DOD personnel having access to contemporary, economical, effective, and accessible learning opportunities;
- DL should be considered as a learning intervention solution;
- DL capabilities will leverage interoperability; and
- DL will be shared throughout DOD. (Kurta, 2017)

These policy mandates undergird the need for learning ecosystems comprised of expert and diverse stakeholders throughout the DOD's vast enterprise. Distributed learning can help solve the nation's myriad national defense challenges. The ADL initiative itself is led by a network of advisors called the Defense Advanced Distributed Learning Advisory Committee (DADLAC). The DADLAC, comprised of the DOD's distributed learning ambassadors from the DOD's components, should be leveraged to champion stakeholder ecosystems and their value.

Social Constructivism Theory

Learning ecosystems and their individual stakeholder components emanate from social constructivism theory. Adults learn in a sociocultural context. In this article, best practices for learning ecosystem design and sustainment are viewed through a social constructivist lens, which centers on "how people make sense of their experience" (Merriam et al., 2007, p. 291). Ecosystems are a microcosm of that sociocultural orientation in that they amalgamate perspectives, orientations, thoughts, and emotions needed to construct a learning intervention. Basing ecosystems on social constructivism promotes the construction of knowledge "when individuals engage socially in talk and activity about shared problems or tasks" (Merriam et al., 2007, p. 291). Learning ecosystems follow the constructivist's focus on experiences, reflection, communities of practice, and situated learning. Seminal works such as Dewey

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(1916), Illeris (2011), Lave and Wenger (1991), and Lindeman (1961) make indelible contributions to these focus areas. As Dewey (1916) observes, "Any education given by a group tends to socialize its members, but the quality and value of the socialization depends upon the habits and aims of the group" (pp. 95–96). Groups must promote "mutual interest" and "freer interaction" (p. 100) to achieve the pragmatic and socially constructed ideals that Dewey promotes.

Ecosystems are themselves an educational collective in which mutual interests and socialization occur. As Lindeman (1961) notes, collective life becomes an educational experience when social function methods that promote different perspectives and creativity are expressed. Collective functioning enables intelligent contemplation on questions such as "What further information do I need concerning the various aspects of the impeding environment?" (Lindeman, 1961, p. 116). To that end, the workplace is one such learning space. Illeris (2007) offers advice that extends to ecosystems: "Educational institutions and workplaces must … see each other as partners in a common project that aims at creating relevant competence development for employees" (p. 122).

Constructivism-based collaborative inquiry—"a process consisting of repeated episodes of reflection and action through which a group of peers strives to answer a question of importance to them" (Bray et al., 2000, pp. 6–7)—highlights interactions with people and promotes diversity of thought. Situated learning yields legitimate peripheral participation, "engagement in social practice that entails learning as the integral constituent" (Lave & Wenger, 1991, p. 35). Moreover, "identities [are] long-term living relations between persons and their place and participation in communities of practice" (Lave & Wenger, 1991, p. 53). For ecosystems, "a learning curriculum unfolds in opportunities for engagement and practice … it is the characteristic of a community" (Lave & Wenger, 1991, pp. 93, 97). The ecosystem itself is a diverse learning construct.

Related theories and models were borne from social constructivism to include the triple helix model (Etzkowitz & Leydesdorff, 2000) and agile instructional systems design (Training Industry, n.d.). Etzkowitz and Leydesdorff (2000) propose an empirical triple helix program to facilitate exchanges between government, industry, and academia. These exchanges were to fuel healthy relationships and feedback between the participating institutions.

In building on the legacy Analysis/Design/Develop/Implement/Evaluate paradigm, which has been a staple of instructional systems (curriculum) development for decades (Hodell, 2011), the agile learning design model likewise confers the criticality of analysis in the service of speed, flexibility, and collaboration (Training Industry, n.d.). The agile learning design tenets amplify frequent and point-of-need collaborations with stakeholders. Within the learning design context, stakeholders can serve as subject-matter experts "to check that the content is correct and clear" (Hodell, 2011, p. 71).

Agility, inquiry, and collaborations relate to the research and practice of action learning which draws heavily on social constructivism. Action learning involves a group of stakeholders who work through real world and crucial business imperatives (Marquardt, 2004; Robertson & Hekcroodt, 2022). The "wicked" problems that confront action learning involve stakeholders, "each of whom too has their own legitimate role, perceptions, aims, intentions, feelings, and skills with relation to the 'common' problem. … It is essential to involve all stakeholders—or representatives in all of them—in tackling the issue *together*" (Boydell, 2022, p. 193). Boydell describes stakeholder dynamics that include power, influence, differences of perception and opinion, and triaging priorities. Interventions such as problem network analysis are related closely to the stakeholder analysis framework discussed in the next section.

Stakeholder Analysis and Related Imperatives

The previous sections characterized the drivers for the ME WFD learning ecosystem and situated it in the social constructivism theory. Attention now turns to stakeholders that comprise the ecosystem. For purposes of this article, a *stakeholder* is anyone or any entity who is influenced by or could influence you and/or your project. A *stakeholder analysis* is the process of understanding the motives, power base, alliances, goals, etc., of each stakeholder.

Attributes of effective stakeholder relationships and dynamics must be considered as contributing factors to stakeholder analyses and as antecedents to value-added partnerships formed and sustained in a collective entity (e.g., ecosystem). A best practice draws from Marquardt (2011), who offers that great value for a learning culture can be derived when there is "collaborative creativity in all contexts, relationships, and experiences, and the measure of success is the combined wisdom and synergy" (p. 68). Ecosystems can promote a "we" culture because of the collective and purpose-centric orientation (Pink, 2009). This is an essential driver; as Pink (2009) offers, purpose, when coupled with autonomy and mastery, can harness powerful and productive motivations.

Change agents can be effective, powerful, purpose-centric motivations for network partners. These change agents "are typically partners and stewards who have a strong sense of ownership and commitment to success" (Rosenfeld et al., 2001, p. 50). Contemporary work environments are dependent on networks of a dynamic suite of agile teams (Carboni et al., 2021). Those agile-fused ecosystems are predicated on connections "with precision and intentionality" (Carboni et al., 2021, p. 6). Dynamic and fluid ecosystems should concentrate on factors to include shaping the nature of the work, stimulating innovation (Rosenfeld et al., 2001), teaming, engagements, and streamlined practices. In addition to consider-

ation, stakeholders must be engaged and with a rich source of collaboration for designing and executing learning projects. Individual stakeholders can be assets or liabilities. Wehrung (2020) advises that learning practitioners take a conservative approach at the outset to obtain buy-in and effective partnering. Russ-Eft and Preskill (2009) offer that "involving stakeholders provide opportunities for ensuring all voices are heard" (p. 477), which promotes an egalitarian and inclusive feedback environment and, in turn, a reinforcement of each stakeholder's contributions.

Stakeholder equities and role clarity matter. Identify, list, and prioritize stakeholders (power and interest grid). Make the investment to understand stakeholder equities (Wehrung, 2020). Adults must appreciate and grasp the reasons for learning something (Knowles, 1984). In a similar vein, stakeholders need to know why they should be involved. McElroy et al. (2020) urge using a Responsible/Accountable/Consulted/Informed approach to classify stakeholders and delineate roles. Stakeholder interests and power should be visualized. Build and sustain robust connections throughout the learning ecosystem. Conduct an organizational network analysis.

Although stakeholders can be considered collectively as a group of members with equities in a learning project, the stakeholders themselves are not homogenous (Sleezer et al., 2014). There can be substantially varying degrees of congruence (or divergence) when comparing the needs and interests of one stakeholder vis-à-vis another. Giattino and Stafford (2019) note, "The learning ecosystem concept necessarily involves many diverse components, likely derived from different vendors, across organizational boundaries, and for different phases and aspects of learning" (p. 319). Sleezer et al. (2014) outline eight discrete world views and how each lens manifests in terms of stakeholder actions and perceptions. These perspectives underscore the importance of understanding stakeholders and attending to their agendas. Just because stakeholders have coalesced around a common learning project does not mean what drove their interest or what would satisfy their own objectives are similar. The type of needs assessment, which, according to Sleezer et al. (2014), encompasses knowledge/skills, job/task, competency-based, strategic, and complex, must also be factored into the stakeholder analysis since each type has a different focus.

Stakeholder engagement is another important factor. Relevant andragogical (Knowles, 1984) concepts include readiness, problem-centered orientation, and intrinsic motivation. For instance, to what degree is an individual stakeholder ready? Is there buy-in, and how do you know? What motivates the stakeholder? Is there consensus on the terminal learning outcomes for the project? In a similar vein, Williams et al. (2022) situate a conceptual and theory-building model of innovation and leadership. The fifth and ultimate level of the model's hierarchy is creative engagement, which the authors define as "the creation of novel and

Table
Give and Get Activity

Stakeholder	Give		Get	
	Will Provide	To Whom	Needs (describe)	Who Will Provide
You				
A				
B				
N				

useful solutions, across the spectrum from incremental to radical, that engage the cognitive, emotional, and behavioral energy of individuals working alone or in groups" (Williams et al., 2022, p. 8). These creative engagements can serve as useful catalysts for thriving learning ecosystems.

Best Practices

The best practices are offered in three tracks: (1) forming the stakeholder ecosystem, (2) assessing stakeholder relationship health, and (3) maintaining stakeholder networks.

Forming the Stakeholder Ecosystem

There are different techniques for network establishment. A simple yet highly effective implement is a "give and get" activity. This tool can surface motivations and energy toward ecosystem participation. The "give" is what a stakeholder member will contribute (and add value to) the collective. The "get" is what a stakeholder needs from the ecosystem (or individual stakeholder members) to join, stay engaged, and gauge the ecosystem investment as worthwhile. For a sample, see the Table.

As a companion to the table, there is a series of questions that stakeholders should consider in the ecosystem context. Exploring these queries can aid in getting to know the stakeholders, acclimating individual parties into the ecosys-

Figure 1
Stakeholder Acclimation Questions

tem, and understanding power, influence, and motivational attributes. Figure 1 illustrates these questions (Rude, 2022).

Stakeholder Health Analysis

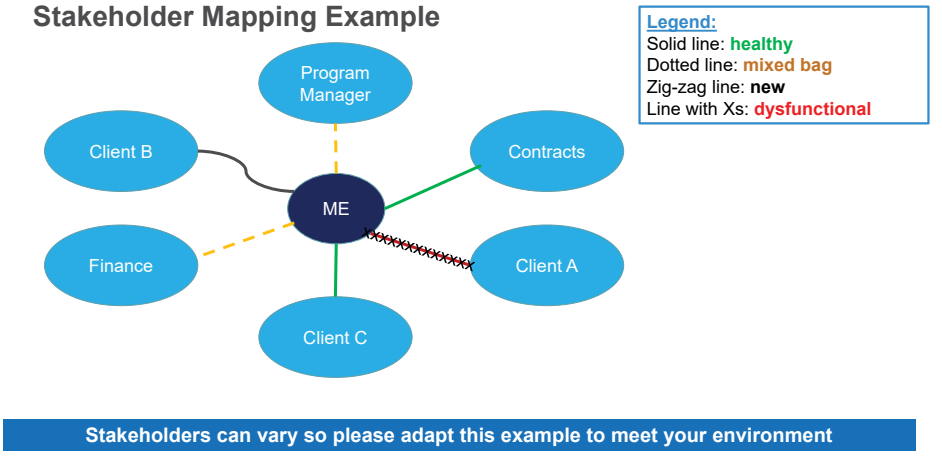
Once stakeholders join, attention must turn to sustainment. Assessing stakeholder health is vital to ecosystem relevance and vibrance. At this juncture, network mapping can serve as a useful visual to discern degrees of health using categories such as healthy, mixed bag, new, or dysfunctional. An example is shown in Figure 2. It begins with you in the middle and builds out from there.

Once the map is drawn, reflect on its findings. As offered by Deszca et al. (2020); Roberston and Hekcroodt (2022); and Rude (2022), consider some questions:

For those relationships that are **healthy**, what makes them so? How did that come about?

- For those that are a **mixed bag**, what can be done to get them to a healthier state?

Figure 2
Stakeholder Mapping

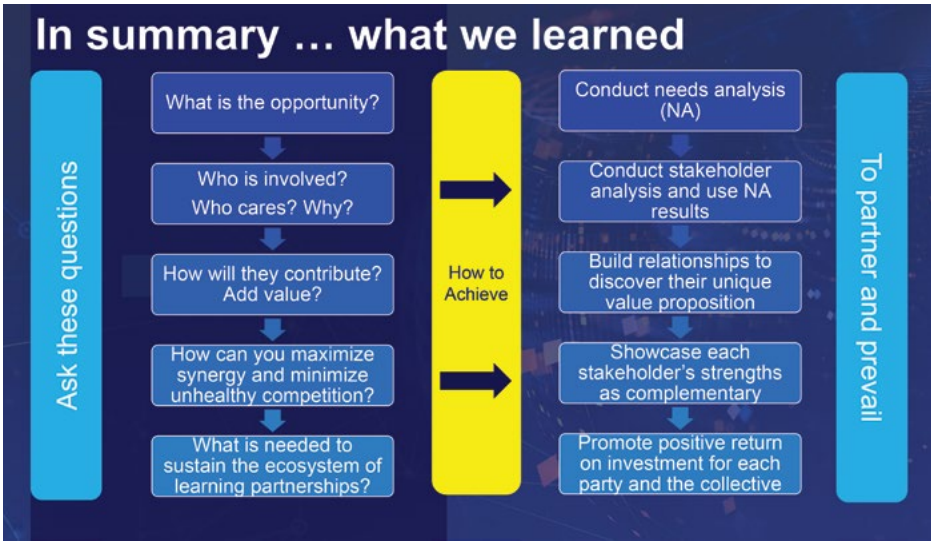


- For those that are **new**, how can that relationship be built, and trust and credibility promoted?
- For those that are **dysfunctional**, what are initial thoughts about how to fix that?
- How will stakeholders work on this distributed learning opportunity?
- What are the goals? Rules of engagement?
- Are you reflecting, listening actively, respecting, and appreciating diverse contributions?
- Who are the enablers? Resistors?

Maintaining Stakeholder Networks

Ecosystems such as those in a distributed learning context may be established to align with long-term vision and strategies. As living organisms, ecosystems are dynamic in nature. Individual stakeholders will enter and exit, and over time, their contributions may shift. To that end, what changes have you observed? Mavo-Navarro (2022) encourages that the person assigned to be the project sponsor discuss stakeholder attitudes (positive or negative), while roles, power, and influence be monitored routinely. Also, the project sponsor should determine issue taxonomy (objectives, roles/responsibilities, communication protocols). Stakeholder relationship principles should be founded on ongoing transparency and

Figure 3
Constructing and Sustaining Ecosystems to Partner and Prevail



frequent, effective communications. Get short-term wins. Attend to relationships that can suffer. Focus on schedule, cost, performance, scope, and risk mitigation (Mavo-Navarro, 2022).

Summary

Figure 3 illustrates a roadmap for thinking about how, for instance, distributed learning ecosystems can partner and prevail (Rude, 2022).

Conclusion

As noted by Marquardt (2011), immense value for a learning culture can be derived when there is "collaborative creativity in all contexts, relationships, and experiences, and the measure of success is the combined wisdom and synergy" (p. 68). To that end, the social constructivism foundation and best practices informed by lived experiences in shaping the ME WFD learning ecosystems are offered as insights for harnessing the collective potential of stakeholders in the military learning, distributed learning, and related environments. Brief implications for research, theory, and practice in a military learning milieu include the following:

Implications for Research. As discussed, social constructivism theory posits that adults learn in a collective orientation. This portends further research as learning continues to evolve in and with the metaverse (including augmented and virtual reality, and artificial intelligence) and human-machine teaming. The military has a longstanding use of, for instance, simulations—a form of virtual reality—in training pilots. Gamification and other learning modalities in the metaverse space could benefit from exploring social constructivism from a research perspective.

Implications for Theory. This article advances another frontier in which social constructivism and related adult learning theories concentrate on collective learning. Military learning doctrine, such as that espoused in Chairman of the Joint Chiefs of Staff Instruction (Vanherck) 1800.01F which issues Joint Professional Military Education (JPME) policy for "students, faculty, delivery modes, and the educational requirements for Joint Officer Management" (Vanherck, 2020, A-1) across the military departments. Social constructivism should be promoted as a useful theoretical foundation for JPME curriculum.

Implications for Practice. As McChrystal (2015) noted, "the speed and interdependence of the modern environment create complexity" (p. 245). Through an interconnected social network showcased in this best practices article, military learning that focuses on socially constructed performance objectives can become a force multiplier for achieving complex warfighter mission success.

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Note

1. See iFEST 2022—*New Paradigm of Learning: Partner and Prevail*, retrieved 6 February 2023 from https://adlnet.gov/events/20220816-iFest-2022/.

Peer Reviewed

The Holy Grail of Developing Partnerships for DL in Military Education

The Keys to Success

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Abstract

The use of distributed learning (DL) environments is growing at an exponential rate. Support for these environments takes on many different forms, but all the players in this arena (military, civilian, and contractor) need to develop relationships and partnerships to foster institutional success and promote learning outcomes for military learners. In this article, we examine characteristics that promote partnerships for distributed learning. We describe key elements of effective partnerships, including understanding roles, creating trust, dealing with change, leadership roles, and building cross functional partnerships. This article provides evidence-based best practices and strategies for navigating the complex web of military partnerships, professional relationships, organizational structures, group dynamics, and shared goals as well as addressing identified barriers to make true partnerships possible. DL partnerships require cultivation, but the time and effort invested in fostering these key elements will promote institutional success.

In today's world, distributed learning (DL) has gone from "nice to have" to a requirement. To effectively navigate DL technologies that promote student learning, educators, support staff, and leadership must come together in partnership to achieve a shared mission and vision. Who works together, and how and when they work, are critical aspects of successful DL partnerships in education.

A partnership, as defined by the World Health Organization's African Partnerships for Patient Safety (2009), is "a collaborative relationship between two or more

Figure 1
Example Cast of Players and Their Roles in DL Partnerships

parties based on trust, equality and mutual understanding for the achievement of a specified goal … that involve risks as well as benefits, making shared accountability critical" (p. 2). This article highlights the unique affordances gained when true partnerships are formed. Both teams and partnerships have groups of people working together on a task, but not all people working together are a team, and not all teams form true partnerships. In a team, each member normally only speaks to their area of expertise, whereas in a partnership there is a collective voice, and everyone can

provide input on aspects outside of their areas of expertise. While teams and partnerships share many characteristics, the critical difference between them is how the relationship is fostered. Considerations for fostering such relationships will be the focus of this article.

Background—The Players in DL Partnerships

A partnership involves a cast of players that includes a wide variety of people representing different stakeholders or groups and incorporates diverse viewpoints. Finding stakeholders beyond the typical silos and including them is critical for the success of DL (Katz et al., 2002). In the military environment, partnerships are likely to include military, civilians, and contractors.

The way the cast of players interacts impacts the partnership. Not all members must be included in all partnerships focused on DL, but the leaders of the initiative should analyze and discuss who should be involved before any DL partnership is formed to

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be sure that there is appropriate representation from across the organization to successfully meet the mission. Leadership for the partnership can come from any of the functional areas, as described in Figure 1, or a partnership can have a dedicated project manager/leader whose role is to oversee the project. Many times, the leaders of the project work across departments and have the best insight into the landscape outside of the partnership, which is essential for organizational communication and to keep silos and duplication of efforts to a minimum.

It is important to note that contractors and subcontractors may be part of any of these partnerships. The leader needs to clearly identify how the contract supports the goals/mission of the project, establish a relationship and a communication plan with the contractors' project/program leader, and have a clear understanding of the chain of command within the organization. The leader may not allow contractors to supervise government personnel, activities, or perform inherently governmental functions (Acquisition.gov, 2022).

Distributed learning projects benefit from bringing together stakeholders with many different roles and responsibilities (Xu & Morris, 2007) within the military environment. The cast of players—military, civilians, learners, and contractors—provides the diverse viewpoints needed for successful DL project partnership.

Partnership Types

Different types of partnerships can be formed to advance DL projects in government, military, industry, and academia. Aligning the partnership type with its mission and goals is important. Below are different types of partnerships that can advance DL projects.

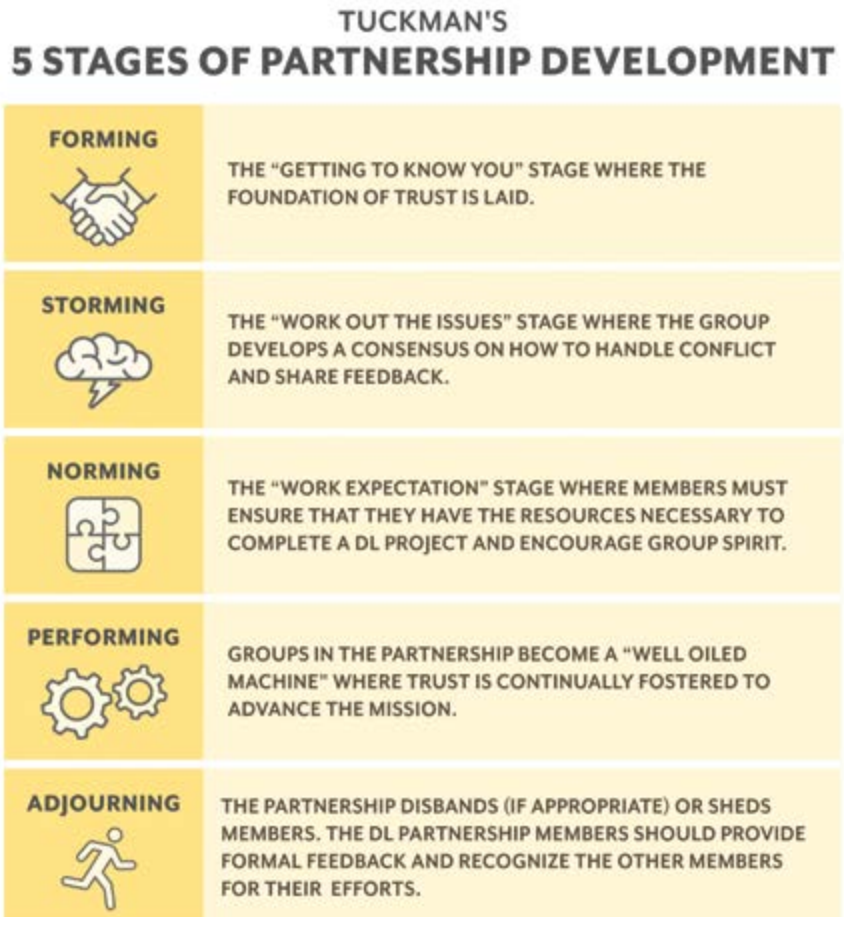
Dynamic or Task Force Partnership

These partnerships are made up of stakeholders from various departments or functional areas who come together to quickly address an immediate organization-wide task/problem. It could bring together almost any member from within the organization. There is normally one leader. The partnership is dissolved once the task/problem has been completed or solved. An example from DL using dynamic or task force partnership is bringing together a group of instructional designers, graphic designers, faculty, learners, and IT staff to develop standardized templates to be used within the learning management system for the organization.

Functional Partnerships

These partnerships occur when members of the same department or functional area are brought together intentionally to focus on a task/problem that affects

Figure 2
Tuckman's 5 Stages of Partnership Development



that organization on an ongoing basis. There is a single leader who is responsible for the entire group and its outcomes. This type of partnership does not dissolve once the immediate need is met; the members move on to address other related needs together. A curriculum review committee that reviews DL courses is an example of this type of committee. It could include trainers or faculty as well as representatives from departments. Once a single course review is completed, the partnerships do not disband. They continue to work in their functional groups as a committee to review more courses over time.

Interworking Partnerships

These partnerships are made up of members from different areas of activity, and members are usually at the same level of the organization's hierarchy. They form to provide a multidisciplinary view of a task/problem. There is normally one leader. This type of partnership dissolves once the project is completed or the problem is solved. An example of this type of partnership would be bringing together a group of department heads to look at a new mission and vision for DL and refine the strategic plan to reflect those changes.

Developing Partnerships

Developing partnerships takes time and commitment. Bruce Tuckman's (1965) five-stage model of the group development process provides a lens for examining the evolution of group dynamics as effective DL partnerships develop in the unique context of the military and government environment. Tuckman's (1965) five typical stages include the following (see Figure 2):

- **Forming.** This is typically the "getting to know you" stage. Because true partnerships rely heavily on relationships for success, this phase is critical. During this stage, the group develops an understanding of the project goals and mission, expectations are set, plans for communication are developed, and a foundation of trust is laid.
- **Storming.** This is typically the "work out the issues" stage. Managing conflict and developing a shared sense of ownership and partnership for the task with group members are essential. The group starts to work on ideas and brings forward stylistic and personal differences. During this stage, roles are clarified, responsibilities are identified, and processes are documented. The group develops consensus on how to handle conflict and shares feedback.
- **Norming.** This is typically the "work expectation" stage. Group interaction and shared decision-making continue to support partnership building. The partnership members must ensure that they have the resources necessary to complete a project and encourage group spirit.
- **Performing.** This is typically the stage when the groups involved in the partnership become a "well-oiled machine." The partnership members must be sure to check in and ensure they are fulfilling each other's partnership needs and providing positive reinforcement and support to one another. When feedback is provided (both positive and negative), the group must do so in ways that foster trust and capture learning points that advance the mission.
- **Adjourning.** At this point the partnership plans to disband (if appropriate) or shed a substantial number of members. It can be seen as the "light at the

end of the tunnel" stage. This often occurs when the project closes out. The partnership members develop options for disbanding. They may also create after action reports to reflect on lessons learned. At this stage the partnership members should provide formal feedback and recognize the other partnership members for their efforts.

A key to success is the intentional recognition and cultivation of the five stages to ensure smooth transitions. These stages implemented within a military context are affected by the military members' time in office, rank, leadership style, prior experiences, and communication. Through application of the five stages in the unique military context, true partnerships are more likely to form that advance the mission of the organization.

Partnership Considerations

While the cast of players and partnership types are diverse and unique to each DL project, strong partnerships rely on communication, affirmation of the value of members, trust, conflict resolution, clarity of roles and responsibilities, shared decision-making, developing self-awareness as a leader, and organizational context and culture. These key considerations allow teams to move through the stages to form true partnerships.

Communication

Wagner et al. (2014) found that intentionally bringing together people who think in distinctly different ways can support partnership development. "Clear and open communication is a key factor in bridging those unique perspectives" (Wagner et al., 2014, p. 668) to strengthen the partnership. Communication includes sending and receiving information both verbally and nonverbally. It is important to make sure that the message sent is the message received, and that group members listen to each other—listening to understand, *not* to respond. Group members should use clear, closed-loop, continuous communication (Varpio et al., 2018). Continual and rigorous communication should encompass multiple methods and harness technology tools, including face-to-face and virtual meetings and weekly status updates (Roytek, 2010). The underlying goal of communication is to foster social interactions that engage members to build the relationship and the group's collective voice—sharing information, clarifying project needs, reflecting on progress, discussing issues and solutions, and offering innovative ideas (Gardner et al., 2017; Wagner et al., 2014). Richardson et al. (2019) highlight the need for all parties to leave room for disagreements, to ensure creativity in finding the best solutions to support learning.

Cultivating a Culture of Trust

The cultivation of a culture of trust is one of the pillars for groups to engage productively and partnerships to form. Building trust takes time. Partnership members must be able to rely on and trust each other to be effective and gain mutual respect, accountability, and cohesion (Fiscella & McDaniel, 2018; Lencioni, 2002; Varpio et al., 2018).

These traits are tightly connected; spending a lot of time together does not ensure that partnership groups will be cohesive. Without cultivating a culture of trust, educational groups may work on the mission/project, but they never realize the full potential (Richardson et al., 2019). The Concerns-Based Adoption Model (Hall & Hord, 2015) is one method with which trust and support is built within partnerships. By considering how unique individuals may respond to a DL project, actively listening to concerns, and employing support, the leader can build the working relationships in a way that will improve outcomes and increase buy-in. Formal face-to-face meetings (whether physically together or virtually) create an opportunity for an exchange of information that may help in improving member trust and rapport. Accounting for potential barriers such as time zones and sites limiting use of certain technology tools can help new members gain trust in the leadership's understanding of individual circumstances (Bawa & Watson, 2017; Flavián et al., 2022)

Conflict Resolution

Conflicts occur when there are differences of opinions, interests, and/or actions intrapersonally and interpersonally. Conflict can be positive or negative, depending on how it is framed, interpreted, and addressed within a partnership. When conflict is not addressed, left unresolved, or handled unjustly, it can be detrimental to mutual trust and respect built within the partnerships (Nielsen et al., 2012). Working to resolve any conflict can further the partnership's goals and missions. It can also reduce conflicting messaging, duplication of efforts, competing interests, and poor implementation of DL products.

Roles and Responsibilities

A common predictor of an inefficient group is confusion about individual roles and functions (Razak, 2013). Having intentional conversations about each member's role, responsibilities, and chain of command enhances self-regulation and helps ensure projects are effectively completed. Partnership effectiveness also relies on ensuring that each member of the group is valued, all members perceive they are valued, and all roles are understood to be valuable and important (Bell et al., 2018; Varpio et al., 2018) whether the member is military, civilian, or contractor. Additionally, when partnership members

have the "required complement of knowledge and skills, … [they] can effectively integrate their efforts to achieve the [partnership's] purpose" (Bell et al., 2018, p. 351).

Shared Decision-Making

All members of a partnership must commit to decisions with a focus on the collective results and a commitment to shared decision-making. Partnerships have been shown to increase creative outputs when shared decision-making techniques are implemented (Hoch, 2013). Despite the variability in shared decision-making designs and practices, there are important considerations when implementing shared decision-making that supports contribution and promotion of ideas of all members (Hoch, 2013). Listening to others can help partnership members reframe issues when decisions need to be made. A partnership where members listen to others, value different perspectives, ideas, and experiences, and promote discussing them openly can foster an environment that can encourage creativity when making critical decisions such as what DL will look like at the organization, rules behind DL use, and DL policies.

Leadership for Partnerships

Effective leadership for a partnership supports relationship building, transforming mindsets, and completing successful missions/projects. The military's unique educational environment is strengthened by a leader that promotes a shared mission and an intentional design of integrated groups to foster the development of partnerships. This article follows Northouse's (2010) definition of leadership as "a process whereby an individual influences a group of individuals to achieve a common goal" (p. 3).

Groups of people can work together, but it is the intentional building of relationships that allows for true partnerships to form. Without leadership support and oversight, partnerships may work on the same DL mission, but they would not reach their full capacity through incorporating trust, time, conflict resolution, and communication.

Taking the time to reflect on one's leadership style and how it influences a group of individuals to achieve a mission/project should be ongoing. Also, thinking about how one is taking care of the group (Noddings, 1984) can help the leader foster relationships. It is with this reflection that the leader can build the power of the group and the value that a true partnership brings to any DL project while supporting the organizational contexts and culture.

Conclusion

The support of DL environments takes on many different forms, but all the players (military, civilian, and contractor) in this arena need to develop partnerships to

foster institutional success and effectively promote learning outcomes. The keys to success for building groups into effective DL partnerships include fostering communication, cultivating trust, dealing with conflict, defining roles and responsibilities, and sharing decision-making, with all these elements supported and shaped by a reflective leader. A strong partnership developed within the unique organizational context and culture of the military environment takes time and effort but can generate valuable resources and long-term relationships to promote institutional success. Such a partnership can pull together personnel from all over the organization to speak with a strong, united collective voice and guide organizations to new heights in their DL programs and initiatives.

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We continuously accept manuscripts for subsequent editions with editorial board evaluations held in April and October. The *JML* invites practitioners, researchers, academics, and military professionals to submit manuscripts that address the issues and challenges of adult education and training, such as education technology, adult learning models and theory, distance learning, training development, and other subjects relevant to the field. Submissions related to competency-based learning will be given special consideration.

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