A soldier assigned to the 101st Airborne Division uses the Virtual Battle Space 3 (VBS3) system 3 May 2019 at the Joint Multinational Simulation Center's Tactical Gaming Division at Camp Aachen, Germany. VBS3 is a flexible, video game-based platform through which service members can train using virtual scenarios as they would in the field. (Photos by Sgt. Christopher Stewart, U.S. Army)

Teaching the Army

Virtual Learning Tools to Train and Educate Twenty-First-Century Soldiers

Angela M. Riotto, PhD

In October 1988, Gen. Carl E. Vuono, then chief of staff of the U.S. Army, considered the value of the staff ride as an educational tool. In an article in *The Army Historian,* Vuono observes that the study of history "infuses with living immediacy the matrix of tactics, logistics, command, terrain, and technology."[1] He explains that when executed properly, the staff ride can "bring together the realities of war."[2] When Vuono wrote

these words over thirty years ago, the U.S. Army staff ride was one of the few methodological tools for battle analysis available outside of the classroom.[3] Fortunately, this is no longer the case. Today, soldiers have access to several enhanced learning tools through which to study military history, maneuver, command and control, fires, sustainment, and other concepts central to large-scale combat operations doctrine. The on-the-battlefield staff ride remains a foundational instructional activity, but now the U.S. Army also offers virtual staff rides (VSRs), simulation training, and documentary films. Each of these multimedia products draws on historical case studies to develop a richer understanding of the effects of combat on Army personnel. The products available through the Army University Press Films and Staff Ride teams, as well as the National Simulation Center, work well independently, but when used in collaboration, battle simulations, staff rides, and films enhance combat readiness, improve doctrinal and technological competence, and foster a sense of heritage among soldiers. Multimedia learning tools such as these are effective and entertaining means of training and education for twenty-first-century soldiers.

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Each of these tools is available through the Combined Arms Center (CAC) at Fort Leavenworth, Kansas. CAC, as a subordinate headquarters of the U.S. Army Training and Doctrine Command (TRADOC), synchronizes and integrates doctrine, training, education, and leadership development for officers, noncommissioned officers, warrant officers, and civilians. Training is the means by which Army professionals prepare for future operations and gain mastery of individual and collective tasks. CAC-Training supports this mission by conducting training in a realistic, complex training environment, both virtually and in person.[4]

Along with training soldiers to perform tasks, CAC also educates soldiers in leadership, critical thinking, ethics, judgment, situational awareness, and problem-solving. These skills must accompany the tactical and technical skills acquired in training to ensure and maintain an informed force.[5] The main component of CAC's educational framework is Army University (ArmyU). When CAC established ArmyU in 2015, then Secretary of the Army John McHugh stressed, "We must continue to educate and develop soldiers and civilians to grow the intellectual capacity to understand the complex contemporary security environment to better lead Army, Joint, interagency, and multinational task forces and teams."[6] VSRs, simulations, and documentary films assist in both the training and education missions.

CAC, as part of TRADOC, strives to provide a learning model to challenge and inspire learners who grew up in the digital world. In 2011, TRADOC published TRADOC Pamphlet (TP) 525-8-2, *The U.S. Army Learning Concept for 2015* (*ALC* 2015) to develop a training and educational model for the all-volunteer Army and, specifically, the twenty-first-century soldier. *ALC* 2015 outlines that the Army must institute a "continuum of learning from the time soldiers are accessed until the time they retire."[7] This focus on the digitally fluent learner highlights the need for and the value of enhanced instructional tools such as simulation programs, VSRs, and films. These products enable learning in and out of the classroom, thus exceeding the expectations of *ALC* 2015.

In 2017, TRADOC amended the learning concept with TP 528-8-2, *The U.S. Army Learning Concept for Training and Education, 2020-2040* (*ALC-TE* 2017). Like *ALC* 2015, this pamphlet emphasizes the need for a progressive, continuous, learner-centric, and competitive learning environment. *ALC-TE* 2017 expands *ALC* 2015 by clarifying that the future learning environment will consist of "tough and realistic conditions and include joint, interorganizational, and multinational components to prepare leaders for 2025 and beyond."[8] This revised concept also focuses on the Army's efforts to enrich learning in the classroom, in the field, and through self-development. To provide learning opportunities in

each of these spaces requires innovative, flexible, and accessible learning tools. Incorporating technology, such as simulations, VSRs, and documentary films, ensures continuous learning for Army personnel, regardless of the soldiers' environment—whether in the classroom, their home station, or in the gym.

> By merging in-classroom study and on-the-battlefield execution, staff rides bring history to life and teach valuable lessons in leadership, strategy, and tactics.

To understand what these multimedia tools offer to the Army, it is important to review their origins, purposes, and products. Each increases Army readiness by delivering creative educational and training solutions, enabling and supporting complex training, and integrating military history. Each organization aims to help the Army learn, train, and win. The study of military history is essential to these products' success and relevancy as instructional tools in professional military education (PME), training, and professional development. Even though military technology has unquestionably changed over time, the nature of war has remained the same. History is full of valuable lessons for the professional soldier. One of the first training tools to integrate history with terrain and troop analysis was the staff ride. After reviewing the origin of the staff ride, this article considers the virtual alternatives to the traditional staff ride and combat training and what these tools have to offer twenty-first-century soldiers.

The Staff Ride

The staff ride as a training tool is not new. The concept originated in the mid-nineteenth century with the Prussian general and theorist Helmuth von Moltke the Elder. The Prussian staff ride model consisted of rigorous study of a specific battle or campaign, tabletop war games, and an opportunity to reflect on the lessons derived from the experience.[9] Students at the U.S. Military Academy at West Point participated in a nascent version of a staff ride shortly after its conception in the 1860s. In these initial exercises, West Point instructors asked cadets to analyze historical battles from the various commanders' viewpoints. Although these early staff rides rarely occurred on the actual terrain where the event transpired, students examined all aspects of the event through the study of official reports, correspondence, and maps. The main goals of the staff ride were, and continue to be, to develop terrain analysis and leadership skills among the next generation of Army leaders.

The on-the-battlefield (or ground) staff ride, as we know it today, was added to the U.S. Army Command and General Staff College (CGSC) curriculum in 1906. For the first staff ride, Maj. Eben Swift took twelve students to the site of the 1864 Battle of Chickamauga.[10] Interrupted by World War II, military history instructors at CGSC and the Army War College reintroduced the staff ride to PME in the late 1960s. Historian and CGSC professor William Glenn Robertson codified the Army's staff ride doctrine with *The Staff Ride* handbook in 1987.[11]

The ground staff ride provides a unique method of conveying the lessons of military history to present-day Army leadership. A staff ride consists of three distinct phases: preliminary study, field study, and integration.[12] By merging in-classroom study and on-the-battlefield execution, staff rides bring history to life and teach valuable lessons in leadership, strategy, and tactics. The staff ride remains an important part of professional development and education of Army leaders, from Academy cadets to field grade officers at the School of Advanced Military Studies.

The Virtual Staff Ride

To satisfy TRADOC's request for virtual learning tools, staff rides are no longer limited to battlefield excursions and tabletop war games. In the *Staff Ride Handbook*, Robertson argues that the "historical case study encourages the identification of universal military lessons [and] a visit to the actual site is the ultimate means of reinforcing these lessons in the minds of students."[13] But what happens when instructors and students are unable to visit the historical site of operations? What happens when the battlefield

no longer exists? What can PME instructors offer beyond tabletop war games, whiteboard sessions, and in-classroom discussions? Questions like these led to an innovative and fun solution to the challenges of on-the-battlefield staff riding-the virtual staff ride.

The Staff Ride team at Army University Press develops and conducts live and virtual staff rides. By focusing on the timeless and universal aspects of warfighting, staff rides provide critical insights into military operations, leadership attributes, and the realities of war through historical case studies. The Staff Ride team also provides information and guidance to Army organizations on how to conduct staff rides.[14]

A VSR follows the same methodology as a ground staff ride, but the terrain exists in a virtual database. This model replicates terrain based on satellite imagery and the construction of three-dimensional models using Virtual Battlespace 3 (VBS3) to immerse students in virtual terrain. This detailed reconstruction provides the most realistic version of the battlefield as possible. VBS3 is a tactical training and mission rehearsal, three-dimensional, first-person military training simulation program. It provides a visually rich gaming environment with flexible scenarios and terrain options.[15] VBS3 provides less expensive, more efficient training and educational opportunities by enabling participants to exercise on a variety of tasks. These capabilities make VBS3 a versatile, applicable, and compelling instructional program.

In 2005, the CAC commander, Lt. Gen. William S. Wallace, directed the Staff Ride team, then a part of the Combat Studies Institute (CSI), to develop a VSR for Operation Iraqi Freedom. Wallace championed the traditional staff ride method, and he sought to expand the topics covered by CSI to include modern conflicts, such as the Global War on Terrorism.[16] Because visiting these sites would be expensive and dangerous, an Operation Iraqi Freedom staff ride would require bringing the terrain to the students instead of the students to the terrain.

To accomplish this mission and still follow *The Staff Ride* handbook guidelines, CSI embraced new technologies and techniques. The team outlined three conditions for this new instructional program to be considered successful. First, team members needed 3-D artists/terrain developers to construct elaborate terrain databases that simulated the actual terrain. For instance, the Staff Ride team offers a Battle of Stalingrad VSR. Stalingrad of World War II no longer exists, but the terrain developers created the historical terrain from period maps and photographs. These databases also include more than just terrain features. As representations of real battlespaces, the terrain also offers architecture, vehicles and equipment, and weather. Second, the Staff Ride team wanted databases that allowed for free movement within that terrain. Other simulation software only provides limited terrain paths. VBS3, however, allows for free-moving simulations so that VSR technicians can virtually move around the terrain at varying elevations and to numerous locations. This free movement facilitates discussion about the commanders' differing perspectives and encourages more in-depth terrain examination among participants. Third, this software had to be portable so that the Staff Ride team could conduct VSRs outside of Fort Leavenworth when requested. By loading the software onto laptops and using gaming controllers, the Staff Ride team can travel and conduct staff rides at installations and schools in the United States or abroad.[17]

As of 2020, the Staff Ride team has developed several VSRs that can function independently or supplement the field staff ride offerings. While the value of VSRs is very similar to that of ground staff rides, VSRs offer additional advantages. First, VSRs permit students to visit the terrain without incurring expensive travel costs (the Pacific), endangering themselves (active combat zones), or that no longer exist (World War II-era Stalingrad). Featuring 3-D imagery produced from satellite imagery, photographs, footage, and firsthand accounts from veterans, VSRs employ current technology to conduct effective staff rides without leaving the classroom or home station. VSRs for Iraq and Afghanistan, for example, assist Army units in predeployment preparation before arriving in those countries. Another benefit is the free camera movement, that allows for participants to transition between stands rapidly by moving virtually rather than spending time and money on ground transportation.

Virtual terrain used by the Staff Ride team can be easily incorporated into classes and alongside other products. For instance, the AUP Films team has integrated virtual terrain into its documentaries. This collaboration between teams makes virtual terrain more available to soldiers and the American public without

Soldiers from the 2nd Battalion, 23rd Infantry Regiment, participate in the Battle of Chipyong-ni virtual staff ride 7 August 2019 at Fort Carson, Colorado. The same battalion fought in the actual Battle of Chipyong-ni in February 1951. (Photo courtesy of the Army University Press Staff Ride team)

(Screenshot courtesy of Army University Press)

Screenshot from the *Korea: Chipyong-ni* Film

requiring a scheduled staff ride. What's more, in the case of the Battle of Stalingrad VSR and documentaries, individuals can take advantage of both to gain a greater understanding of that battle. Together, the Staff Ride and Films teams bring history to life and offer an engaging learning opportunity.

Since producing the first VSR in 2005, the Staff Ride team has provided the Army with a new platform for PME, professional development, and training. Although a nontraditional approach to the original staff ride concept, VSRs fulfill Professor William Robertson's condition that staff rides should "further the professional development of U.S. Army leaders."[18]

The Staff Ride team, however, is not the only team to leverage virtual technology to enhance education and training. As mentioned, the AUP Films team also uses virtual terrain to boost its innovative approach to teach Army doctrine and military history through documentary films.

(Screenshot courtesy of Army University Press)

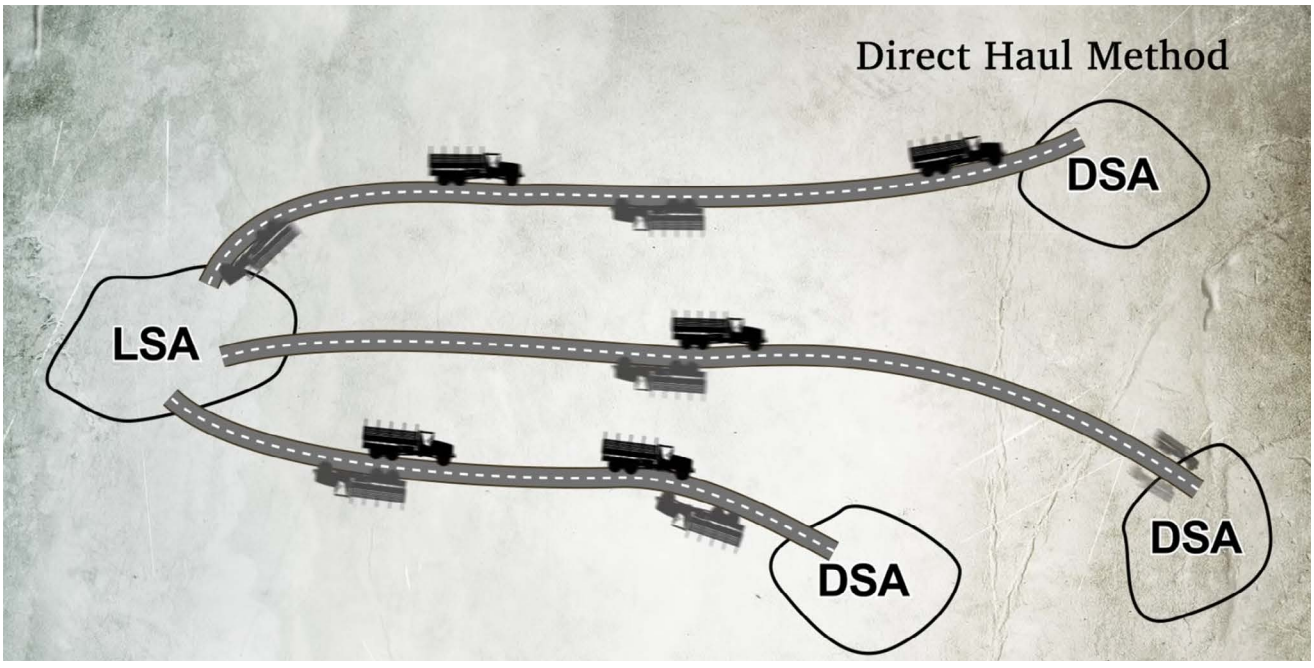
Battle of Stalingrad Virtual Staff Ride Teaching Elements

Documentary Films

Recognizing film's usefulness as an educational tool, CAC, in conjunction with TRADOC, formed the AUP Films team at Fort Leavenworth in 2018. The Films team produces doctrine-focused, historically accurate documentaries for CAC, TRADOC, and the U.S. Army at large. By collaborating with the Combined Arms Doctrine Directorate, Army Centers of Excellence, and ArmyU, the Films team selects relevant doctrine and historical topics that best serve the modern force.

Today's students have more experience with multimedia and technology in and out of the classroom.[19] Films expand the learning environment by leveraging the technology already available to soldiers. Both *ALC* 2015 and *ALC-TE* 2017 ask that the Army provides effective training and education opportunities for the next generation of soldiers. Although neither of these documents mention film, their emphasis on technology by which to teach teamwork, collaboration, critical thinking, problem-solving, and other leadership skills dovetails with the benefits of film. Film can serve as a powerful tool in developing critical- and creative-thinking skills; introducing new topics, ideas, and themes; and increasing students' awareness of differing perspectives. Pairing film with readings, PowerPoint presentations, and writing assignments enable students to reach their highest learning potential from multiple learning styles.[20] To assist instructors and students with meeting their learning objectives, the Films team also provides a list of sources for each film. Recommending these resources alongside the film enables the students to comprehend the doctrine and history presented more fully.

Film is also an engaging medium through which to teach and learn doctrine. In recent years, CAC has directed the revision of several of its key Army doctrine publications and field manuals to align with large-scale combat operations and multi-domain operations. By incorporating these revised concepts into documentaries, the Films team provides the Army with an exciting and accessible learning opportunity. For instance, to



(Screenshot courtesy of Army University Press)

Screenshot of Animated Trucks, Supply Routes, and Logistics Sites Used for Direct Haul from the *France '44: The Red Ball Express* Film

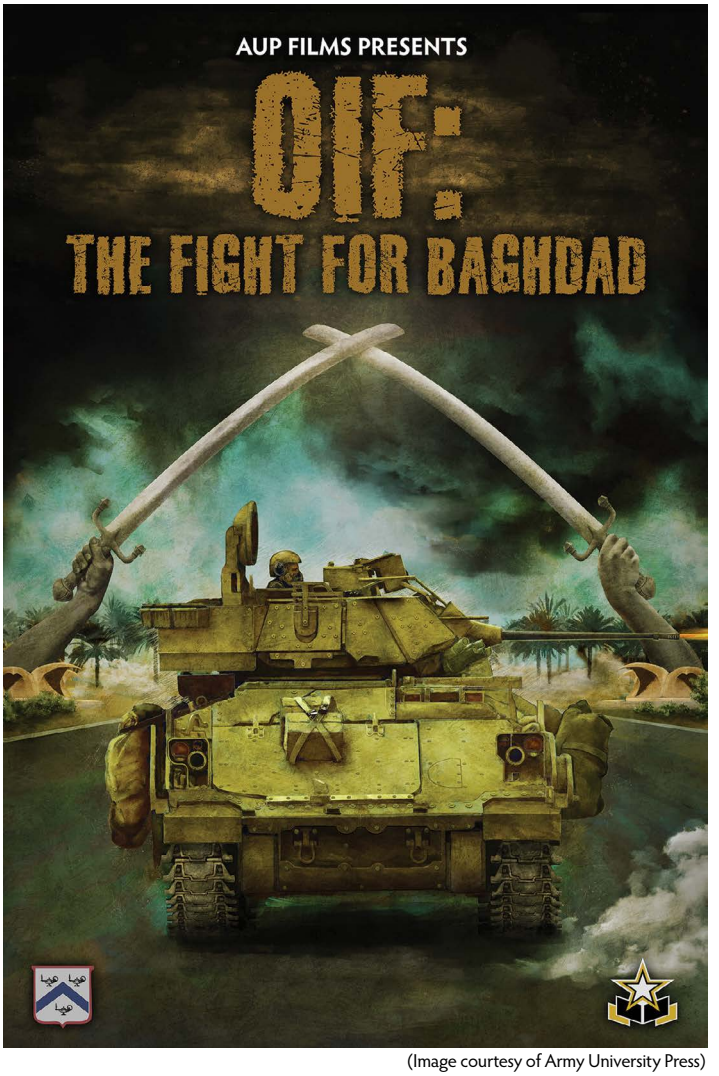
convey the different modes of supply in *France '44: The Red Ball Express*, the film shows animated trucks, supply routes, and logistics sites. When paired with an auditory description of the supply routes, this visual depiction communicates complicated sustainment doctrine with greater effect than text or voice alone.[21]

Another reason film is an excellent learning tool is because people seldom need to be coaxed into watching movies. In some adult research theory, many students would rather watch a film than read a textbook, monograph, or doctrine manual. Films are more entertaining, or at least more engaging and emotion provoking.[22] Film serves as an entertaining and useful tool to help soldiers develop critical thinking and analytical skills as well as familiarize the viewers with Army history.[23] For example, films about the invasion of Iraq in 2003 can help deployed units or units preparing to deploy to Iraq or Kuwait better understand the history of the conflict and why the United States still has boots on the ground in the region.[24]

Instructors or leaders can incorporate films into education and training in several ways. First, PME instructors can assign films alongside or in place of reading. Films provided by AUP Films are available to be streamed online or downloaded. These documentaries range in length from forty-five to fifty-five minutes. A student could easily watch one of these feature-length films in less time than it takes to read a book or a long book chapter. The Films team also organizes its films into sections. These section breaks allow the viewer to pause the film without disrupting its overall flow. This organization provides an opportunity to review the previous section, propose questions for the next section, or assign the film by section. The Films team also produces shorter videos (five to fifteen minutes); like the sections in the feature-length films, they can facilitate discussion and provide additional insight into specific doctrinal concepts or historical events.

Instructors can also show video clips in class or at the break between sections to make a specific point or elaborate on the course lesson. The inclusion of film into a course creates an intellectually stimulating as well as emotionally provoking learning experience.

Using film as concrete evidence is an effective way to deliver knowledge in an entertaining way and broaden classroom learning beyond assigned readings. David Kolb's Learning Style Inventory supports this approach to teaching. Kolb explains that effective learning occurs when a student progresses through a cycle of four stages: having a concrete experience, reflecting on that experience, forming abstract concepts and conclusions, and testing hypotheses in future situations.[25] How a student resolves the tensions between conceptualization and experience and between action and reflection determines the student's dominant learning style: convergent, divergent, assimilative, or accommodative. The introduction of film to the classroom experience, then, provides instructors with a compelling and useful tool to help students develop critical-thinking and analytical skills.[26]



(Image courtesy of Army University Press)

***OIF: The Fight for Baghdad* Film Poster**

If the instructor is unable to show films or film clips as part of the classroom experience, film can also be offered as a supplementary resource. Films broaden students' understanding without disrupting the course schedule or syllabus. PME develops leaders into disciplined and well-educated professionals capable of meeting challenges of a complex world; as such, course directors and lesson authors are expected to adhere to learning outcomes. Film serves as a useful, fun, and flexible tool to enhance courses, meet learning objectives, and engage the enthusiastic learner without encroaching on class time.

One of the advantages of the films offered by the Films team is that they are accessible anytime and anywhere. Viewers can access the videos on classroom computers, personal computers, or on the go from tablets or mobile devices.[27] Former CAC commander Lt. Gen. Michael Lundy envisioned a learning tool that soldiers could enjoy on the treadmill, in the hallway between classes, or sitting on their couches. AUP Films offers just that. The products are accessible and fun ways to learn about military history and doctrine.

Films, however, are not limited to students in PME. Army leaders can also use films as part of professional development or mentoring exercises for soldiers. For instance, the U.S. Army's continued presence in Korea and its relationship with the Republic of Korea Army benefits from AUP's three-part *Korea* film series. The series begins with the invasion of June 1950 and focuses on the U.S. Eighth Army's counteroffensive in winter 1950-1951. These films not only explain the history of the Korean War but also foster a sense of pride and heritage among U.S. soldiers deployed to Korea.[28]

The films produced by the Films team are accessible, adaptive to multiple learning environments,

entertaining, and suitable to visual learners and the twenty-first-century soldier. Packed full of historical footage, photographs, animated maps, interviews, and virtual terrain, these films are educational entertainment products suitable for the self-directed learner, the history buff, soldier, or veteran.

> Films provided by Army University Press Films are available to be streamed online or downloaded. … A student could easily watch one of these feature-length films in less time than it takes to read a book or a long book chapter.

Although designed as learning tools by the Army for the Army, these movies are not just for soldiers. The films are available on the AUP's official website, social media sites (Facebook, Twitter, LinkedIn), and on its YouTube and DVIDS pages. The films are free to viewers for streaming and download and on DVDs by request.[29]

National Simulation Center Training Tools

In addition to VSRs and films, CAC also promotes the use of live synthetic training to enhance, enable, and support training across ArmyU, the Centers of Excellence, and the various training environments. The National Simulation Center (NSC), also based at Fort Leavenworth as part of CAC-Training, provides simulations and virtual games for soldiers. Like VSRs and documentary films, the tools provided by NSC enable users to immerse themselves in their learning environment. This dynamic visualization and active participation set the NSC's training programs apart from the VSRs and films. As such, these products can be used separately as effective learning tools. When Army professionals use them together, however, these tools create a vigorous learning experience.

The NSC uses two systems to generate training environments and simulations: the Division Exercise Training and Review System (DXTRS) and VBS3. DXTRS is a simulation application that creates a game between opposing sides that manufacture cause and effect in combat situations. DXTRS depicts the operational environment, as well as friendly, enemy, and neutral forces. Designed to familiarize students with tactical and operational decisions, DXTRS is a low-cost application that presents the learner with forces, equipment, buildings, and realistic behaviors. This simulation style works well for a decision-making exercise or for teaching complex tasks, such as wet-gap crossing. DXTRS is especially useful for battalion and brigade-level training. Not only does it allow students to test a plan's effectiveness in the program, but instructors can also load predeveloped scenarios.

DXTRS is a reusable, versatile, and low-cost training alternative to live, in-person training. DXTRS provides units of both the institutional and operational Army a training solution that supports battalion through division staffs. CAC adopted DXTRS because it is a relatively inexpensive, schoolhouse-centric alternative to combat training centers (CTC). DXTRS introduces staff officers into an operational environment and situation similar to those experienced by officers at a CTC without incurring additional expenses or taking time away from other courses.

Soldiers can operate DXTRS independently or paired with other systems, such as VBS3, Command Post of the Future, and Joint Capabilities Release. By linking its simulation training with current software systems, NSC is able to train soldiers on multiple systems simultaneously and in real-time. For instance, at the U.S. Army Chaplain Center and School, NSC incorporates both VBS3 and DXTRS to train Army personnel on the use of Tactical Mission Command systems. This capability allows soldiers to operate their vehicles in VBS3 while watching their plan play out on the computer screens in front of them. In

turn, this synthetic training tool simulates the chaos and complexity of combat.

VBS3 is more versatile as an instructional tool than DXTRS. When used for simulation training, VBS3 is excellent for testing tactical processes. Similar to DXTRS, VBS3 allows students to immerse themselves in the environment, even allowing the user to read maps, navigate, and operate equipment. Although more suitable for smaller unit operations, it is adaptable enough for platoon- through division-level operations. Like DXTRS, VBS3 leverages the human component by requiring the user to act in scenarios rather than the computer system dictating the actions and results. It is a comprehensive virtual training environment with over sixteen thousand models of military and civilian vehicles, weapons, and characters and more than one hundred combined arms training tasks. This flexible and versatile training system feels like a game, thus making training fun and informative.[30]

Both of these virtual training tools encourage users to exercise both tactical and strategic thought. Unlike traditional training at a CTC, these enhanced training tools do not require face-to-face instruction or expensive in-person exercises. Soldiers can learn and master skills key to the Army's success from the comfort of the classroom or their personal computers.[31]

Through collaboration with the Staff Ride and AUP Films teams, NSC has produced historically accurate training scenarios to teach complex military operations. For example, NSC has adopted AUP's virtual terrain of Stalingrad to train soldiers on new equipment in dense urban terrain. NSC also collaborated with the Films team to depict the complexities found in wet-gap crossings. Like VSRs and films, NSC's training products can be used effectively alone, but when used together these tools provide an enhanced and deeper learning experience for the twenty-first-century soldier.

Conclusion

Simulations, VSRs, and documentary films are well suited for inclusion into PME as well as unit training. They can be incorporated as supplementary educational and training resources in and out of the classroom. Films especially allow for self-paced and self-directed instruction as soldiers can learn in a variety of environments and from a variety of multimedia formats. Unlike traditional in-classroom and live training, these instructional tools do not require face-to-face instruction or time-consuming training exercises. Soldiers can learn and master skills key to the Army's success from the comfort for their own homes or while deployed. As the Army continues to prepare soldiers and leaders to succeed in a complex world, the flexibility and accessibility of virtual instructional tools can address the types of scenarios and challenges faced in the future. ■

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28. *Korea: Twin Tunnels*, directed by Kimball Johnson and Robert Thompson (Fort Leavenworth, KS: Army University Press Films team, 7 June 2020), accessed 6 November 2020, https://www.youtube.com/watch?v=p97eFNwv_Mg; *Korea: Chipyong-ni*, directed by Kimball Johnson and Robert Thompson (Fort Leavenworth, KS: Army University Press Films team, 21 April 2020), accessed 6 November 2020, https://www.youtube.com/watch?v=_QJgPfH9SG8; *Korea: Sustaining Operation Killer*, directed by Kimball Johnson and Robert Thompson (Fort Leavenworth, KS: Army University Press Films team, 22 May 2020), accessed 6 November 2020, https://www.youtube.com/watch?v=jaqCKY7KwRw.

29. Documentary films are available on several websites: https://www.armyupress.army.mil/Educational-Services/Documentaries/, https://www.youtube.com/c/ArmyUniversityPress/, https://www.dvidshub.net/unit/armypress; Riotto, "Guts, Glory, and Doctrine," 124–25.

30. C. Todd Lopez, "Latest 'Virtual Battle Space' Release Adds Realism to Scenarios, Avatars," Army.mil, 4 April 2014, accessed 30 October 2020, https://www.army.mil/article/123316/.

31. Both DXTRS and VBS3 are free to authorized users under an Army enterprise license and can be downloaded off the MilGaming website at https://milgaming.army.mil/;"Virtual Battlespace 3."