Applying Instructional Design Fundamentals to Next-Generation Training Development

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ABSTRACT

This paper explores the application of traditional instructional design approaches to meet the needs of today's learner amid emergent technologies in the new learning paradigm. Adding to the existing body of knowledge and research behind leveraging instructional design methodologies to develop next-generation, immersive training solutions, this paper will inform readers on best practices, provide lessons learned, and illuminate exemplar use cases from practicing instructional designers working in the military learning sphere.

In recent years, instructional designers are not simply adapting to any single evolutionary development in the training continuum; they are the educational intermediary between a new generation of super technology users and a rapidly expanding landscape of learning theories, development platforms, and technical capabilities. These super users are warfighters who have unprecedented access to eLearning, presented in high-definition across familiar platforms, with just-in-time access to fast-track tutorials at their fingertips. At the most interactive end of the scale, a modern learner clad in virtual reality equipment may even train in an immersive environment, a particularly exciting instructional mode that holds promise in the new learning paradigm. While its high-tech, shiny object allure might seem to render traditional learning models obsolete, immersive reality learning is, at its core, a contemporary extension of traditional eLearning. Today's instructional designers possess a body of accumulated knowledge and research that has been used successfully for decades to inform lesson design and theory; we should not discard past ideas as eLearning advances. Existing theory translates effectively to even the most advanced, cutting-edge eLearning platforms of today.

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THE INSTRUCTIONAL DESIGN CHALLENGE OF TODAY

Modern instructional designers hold a critical role in the training pipeline. They are not simply adapting to any single evolutionary development in the learning continuum; they are the educational intermediary between a new generation of super technology users and a rapidly expanding landscape of learning approaches, development platforms, and technical capabilities. But while developing engaging and effective training for presumed technologically savvy users, instructional designers working within Department of Defense (DoD) environments furnish training for a spectrum of diverse learners, expanding the target audience to include not only the junior recruit but also the distinguished warfighter. Considerations for learning system development expand with an increasingly wide range of enhanced learning tools from interactive electronic technical manuals (IETMs) to virtual reality (VR) tools ready to arm the instructional designer's arsenal for performance support, collaborative and social learning, electronic courses, and physical classroom learning modalities (van Dam, 2012). Along with the variety of output, the instructional designer must be precise with the learning objectives, content, and outcome of the training. With an elevated focus on agile-responsive solution production methodologies to facilitate rapidly deployable training solutions accessible within the DoD construct, instructional designers ought to value employing instructional design fundamentals to meet the needs for next-generation training development.

The New Learning Paradigm

The new learning paradigm becomes applicable when DoD instructional designers are required to:

1. Ensure engaging and effective learning for both the and junior recruit and distinguished warfighter,
2. Provide availability of a wide spectrum of learning modalities to users and organizational stakeholders, and
3. Meet organizational demands for accessible solutions across a range of legacy and modernized systems within DoD architecture, especially when aligned to large-scale learning and development initiatives.

Instructional designers implement time-tested and research-validated core principles in adult learning and training development as the ideal approach for the new learning paradigm. Next-generation learners accessing next-generation learning platforms need accessible and scalable solutions across antiquated and contemporary DoD systems. Front-end analyses (FEA) remain critical at the outset of training development, waterfall and iterative models effectuate the production pipeline, and evaluative techniques used to measure participant learning and organizational change post implementation are more important than ever, leveraging the power of data analytics and artificial intelligence (AI) to offer robust metrics to inform decision makers. These fundamental principles have been accepted and adopted amongst the instructional design community for decades, transcending countless digital transformations and revolutions in the technology industry; their timelessness with longstanding best-practice frameworks provide for military domain instruction.

THE MILITARY APPLICATION OF INSTRUCTIONAL DESIGN AND INSTRUCTIONAL TECHNOLOGY

From influencing psychological and educational principles applied to augment training for military forces during World War II, to instructional standardization efforts to improve basic educational skills learning in public schools during the Cold War, the practice of employing instructional design to streamline and enhance learning solution development has been catalyzed by war and wartime training needs. This is especially so when aiming to standardize methods and processes for learning design (Reisner, 2001; Leigh, 1999; as cited in Hadley, 2004). Fast-forward to today's military environment, warfighting organizations leverage instructional design fundamentals, emergent technologies, and best practice methodologies in software and hardware development to improve and modernize learning systems in support of military readiness.

Contemporary military leaders continue to vocalize the importance of professional military education as the foundation of national security and warfighting readiness (Department of the Navy, 2020). The United States Fleet Forces (USFF) Command (2017) implemented a programmatic initiative to improve and modernize personnel management and training systems to not only more effectively attract and retain their fighting force but provide a continuum of Ready Relevant Learning (RRL) driven by learning innovation and information technology (IT) investment.

> The long-term vision for Ready Relevant Learning includes the preservation of current approaches to training where it makes sense to do so, while also driving a significant evolution in our approach to Sailor development that is deeply rooted in the science of learning. (USFF, 2017, p.4)

Further, Sailor 2025 quantifies the need for ready, relevant training by explaining that among a population of 40,000 new recruits, 30,000 of them will be in training at any given time. This explains the urgency of training delivery at an appropriate time and place. USFF (2017) explains that a newly trained recruit may not use their training for three to five years into their career. As a result, $400 million are accrued in losses due to inefficiencies in training processes (p. 7). Illuminating the symbiotic nature of instruction and technology, Sailor 2025 stands firmly at the intersection of instructional design and technology, forging the best learning approaches and emergent technologies in a unified, tailorable spectrum of learning, offering relevancy and personalization to the range of curriculum offerings by the U.S. Navy.

The concepts of learning continua and ready, relevant learning aren't inherently militaristic, but the range of learners, available technologies, and DoD infrastructure requirements create unique challenges for instructional designers developing military learning explained in the new learning paradigm. The need for training is constant; and the right training in a meaningful and immediately applicable context at the right time arms the warfighting learner with increased performance to execute at maximized capability.

The Warfighting Learner

The military is challenged with providing ready, relevant learning to the warfighter across an extensive learner spectrum; they must cater to diverse warfighter backgrounds: generation, culture, experience, education, and level of skill. Generational differences are an area of interest for instructional designers that may have a significant impact in the way warfighters learn and how their learning needs are satisfied. Younger generations have been exposed and adapted to rapidly evolving technology platforms such as YouTube, modern computer systems, smart devices, and video gaming systems. Older generations have also been exposed and adapted to new technology; however, younger generations may be the most dependent on new technology because of their technology inclination and predisposition. The proposed advantage and modularity of a technology upbringing among personnel is that they are familiar and can transition with less effort to other training systems, which leverage modern technologies. Moreover, today's personal technology devices, tools, and applications have left an instantaneous knowledge formation in the hands of the user. The digital age has facilitated quick access to data, answers, tutorials, news, and forums, and has further cemented an access expectation for digital generations.

Although we can baseline learning preferences for today's warfighter, disconnection between what is desired and what is available can lead to detrimental knowledge gaps. In its 2017 report, USFF Command, Executive Agent for RRL, noted that learning is not always translated in a meaningful way within relevant timelines. Sailors, in particular, are not using the knowledge and skills from their schoolhouse training well until three to five years into their jobs, thus it is not as relevant when they actually interact with the system they are meant to operate or maintain. They need learning that is on time and relevant for when they are interacting with the platform (p. 8). After three years of experience, schoolhouse training that has yet to manifest itself on the job offers a use case for emergent technologies, especially those that aim to provide critical performance improvement at the moment of need.

Emergent Technologies and Next-Generation Training

Emergent technologies are the vehicle by which learning is transported to the learner. From the simplicity of Microsoft PowerPoint presentations for use in brick-and-mortar classrooms to today's fully immersive simulators, coalescence between instructional design and technology has long facilitated the development of engaging and impactful learning solutions. Nonetheless, effective use of such technology can determine the success of the solution.

From an instructional design context, we define emergent technologies as any tool used to facilitate learning, including both tools that are new creations and have recently come to exist, and older tools which are finding new meaning and purpose in contemporary settings. An example of the former is the robust set of head-mounted display (HMD) options available both for commercial and personal use, which enable a user to engage in extended reality (XR) experiences. An example of the latter is the expanded use of instructional videos and distance learning platforms to transform learning to the virtual space in response to travel and access restrictions caused by coronavirus disease 2019 (COVID-19). Veletsianos (2010) defines emerging technologies in the context of the following characteristics:

1. Emerging technologies may or may not be new technologies
2. Emerging technologies are evolving organisms in a state of "coming into being"
3. Emerging technologies go through hype cycles
4. Emerging technologies satisfy two "not yet" criteria:
    a. they are not fully understood, and
    b. they are not fully researched or researched in a mature way
5. Emerging technologies are potentially disruptive, but their potential is mostly unfulfilled. (pp. 13–17)

The vast expansion of technological toolsets for learning can be challenging for designers architecting, developing and implementing solutions. It's simply impossible to maintain relevant subject matter expertise in the instructional design practice while juggling every possible learning technology on the market today. Engagement efforts should leverage collective ingenuity and functional expertise of learning design and learning technology. The intersectionality of disciplinary functions is critical. Learning technologies are a seamless enhancement to improve the educational or aesthetic goals of a program; the technology should "disappear" during the experience to focus the learner on the critical learning tasks and paths imposed by the solution (Roussou, 2000, as cited in Connolly, 2005, p. 6).

For much of the immersive learning industry, a few of the more widely discussed and promising emergent technologies are described in Table 1.

Table 1: Overview of Promising Emergent Technologies

Emergent technology	Description	Sample use case for learning
Augmented Reality (AR)	Use of an HMD or other display to superimpose digital instruction and resources atop a learner's natural-world view	Provide heads-up instruction with integrated photo and video media to facilitate hands-free supplemental training during maintenance of shipboard equipment in low finding-of-death (FOD)/personal risk areas
Mixed Reality (MR)	Use of an HMD or other display to superimpose digital media and models atop a learner's natural-world view	Provide immersive modeling and simulation media of a virtual aircraft platform which shows actual size and dimension without requiring a physical aircraft for the training scenario
Virtual reality (VR)	Use of an HMD or other display to immerse a learner in a virtual world that occludes the natural-world view	Provide full immersion in the cockpit of an aircraft with 360-degree views and interactive controls to teach the location and functions of critical controls

Emergent technology	Description	Sample use case for learning
Instructional Videos	Procedural step-by-step or conceptual videos provided to a learner in a streaming modality (e.g., YouTube) or in a standalone format (e.g., downloaded to an asset for offline use)	Provide step-by-step instruction for radio programming, allowing the learner to pause, resume, and skip to specific sections of the video as needed based on specific areas of need
Interactive Simulations	Task simulation in a digital environment, often with gamified elements and feedback	Provide synthetic training environment for aircraft seat ejection with specific task feedback and remediation based on the decisions made by the learner

Emergent technologies enable learners to gain exposure, receive feedback, and retry the most critical tasks. Instructional designers are able to shift unsafe or costly live learning opportunities to the digital realm. This empowers learners to develop competencies at higher levels before performing tasks in a live training environment or mission scenario (Temby & Whitney, 2019).

As an alternative to employing emergent technologies as complete training systems replacement, modernization of training technologies can help transform legacy systems to meet the needs of the warfighter while reusing existing architectures. Modernization applies contemporary technologies and training approaches to legacy systems, yielding familiar learning experiences across the warfighter learner spectrum. Modernized technologies empower instructional designers with more capability and flexibility on the approaches they can take to develop training. This results in training that can be balanced or tailored to best meet the need of the learner group, composite of individuals and their sensitive learning factors: background, prior knowledge, content interest, and rate of learning advancement, or how quickly learners understand new knowledge, skills, and attitudes.

Delivering Next-Generation Learning in the Hands of the Warfighter

Much of the alluring future-forward emergent technologies are filled with rich, dynamic content, enabled by high-performance systems that require robust bandwidth and network connectivity. Military IT systems available at the point of operations are simply not yet ready to run the dynamically rich learning solutions without careful planning at the outset to scale and tailor such content for accessibility within DoD systems. While the DoD is exploring several technologies that have the promise to provide increased efficacy and efficiency across their systems, limited bandwidth and network latency problems lead to poor performance when streaming videos or interactive multimedia, and those limitations should be considered during requirements analysis (Johnson, 2017, p. 10).

Tailored solutions must demonstrate platform compatibility and infrastructure if emergent technological hardware is to be deployed successfully. With industry driving much of the development in the immersive solutions space, a major consideration amongst military programs ought to be the ultimate interoperability between next-generation learning developed now and that of the future. Instructional designers and stakeholders should concern themselves with vendor lock restrictions and consider how industry will respond in the volatile market for immersive learning technology especially if early adopters hope to find long-term sustainability in solutions developed today. Moreover, as the use of immersive learning platforms spread from the schoolhouse and into operational environments, hardware ruggedization elements—such as ingress protection against dust and water, ability to withstand shock and falls—are also critical consideration factors in delivering learning on next-generation training devices.

The complex environment in which next-generation learning is to be developed is fluid and expansive. Instructional designers, armed with the decades of proven approaches, have transmuted revolutions in both learning and technology, and can support stakeholders in moving beyond the complexities of developing next-generation learning.

INSTRUCTIONAL DESIGN AND NEXT-GENERATION TRAINING

The implementation of instructional design fundamentals in military contexts is longstanding but realizes new application across the emergent technology spectrum and new learning paradigm. A few key fundamental instructional design approaches are explained below, with a brief description, application in both traditional and next-generation

DoD learning development environments, and several examples of each. These approaches are widely understood and applied across DoD learning development efforts and have relevancy across a variety of instructional engagements.

Fundamental Instructional Design Approaches

Instructional Design Fundamental #1: Instructional/Front-End Analysis

Instructional analysis informs if learning is a solution to the identified problem statement, identifies scope and initial requirements, and defines the target audience and intended application of the learning solution. In a traditional DoD context, instructional analyses are conducted at the outset of learning development efforts, often leveraging focus groups, a mix of qualitative and quantitative inputs, and source documentation. This critical milestone informs learning design. In a next-generation DoD learning context, expanded collaboration with non-traditional instructional disciplines such as modeling and simulation, data analytics, and human factors are critical in the requirements gathering and approach capture. Examples include Training Task Analysis (TTA), FEA, and Training Needs Analysis (TNA).

Instructional Design Fundamental #2: Waterfall Methodologies

Waterfall methodologies are traditional software and learning technology solutions approaches whereby each phase of the project effort must be fully or nearly fully complete before initiating work in the subsequent phase. In a traditional DoD context, this is a highly structured model based on moving sequentially or in a controlled series of 'waves' from broad concept to tested solution, ideal for when hard or imposed schedule boundaries and dependencies, especially external, are at elevated levels, and best implemented when there are clearly defined content and feature needs earlier in the project life-cycle. In a next-generation DoD learning context, given the newness of next-generation solution sets, waterfall methodologies may provide less opportunity for stakeholder review and feedback during new learning adoption, elevating opportunities for potential rework, and cost and schedule impacts due to less frequent, larger level of effort change requests. Examples include Analysis, Design, Development, Implementation, Evaluation (ADDIE), Planning + ADDIE (PADDIE), and PADDIE + Maintenance/Sustainment.

Instructional Design Fundamental #3: Iterative Methodologies

Iterative methodologies are contemporary software and learning technology solutions approaches whereby instructional analysis, design, and development occur in small increments producing complete content and capability, with each evolution refined based on feedback and evaluation of the previous increment. Iterative methodologies are best implemented when learning objectives are clearly defined or rapid deployment of subsets of content or capability have added value. This can be a strategic management approach used when covered materials are at different points of stability. Iterative methodologies are also optimal for co-developing parallel learning strategies and content types from source content. Employing Agile methodologies, such as Sprint development, to develop and deliver solutions more frequently and in smaller increments, facilitates rapid delivery of the most critical features or content. Examples include Agile, Lot Like Agile Management Approach (LLAMA) (Torrance, 2014), Successive Approximation Model (SAM) (Allen, 2012), and Spiral development.

Instructional Design Fundamental #4: Evaluative Techniques

Evaluative techniques are methods used to gauge solution efficacy, learner interest, behavior modification, Return on Investment (ROI), and Return on Expectations (ROE) (J. Kirkpatrick & W. Kirkpatrick, 2019). In a traditional DoD context, executing evaluative measures are often time and resource dependent. Of organizations that conduct evaluation analyses, many limit evaluations to Kirkpatrick's Level One Reaction, and few evaluate the impact of training on job performance (Wang & Wilcox, 2006, Griffin, 2011; as cited in Bove & Little, 2019, p. 4). In a next-generation DoD learning context, data analytics can streamline performance capture to support informed, data-driven decision making.

Key Best Practices: Applying Instructional Design Fundamentals to Next-Generation Training Development

Application of best practices in the new learning paradigm are specific to next-generation training contexts. While there is no one-size-fits-all method for learning development, instructional designers should strive to align learner characteristics, learning outcomes, and emerging technology capabilities to provide the most instructionally sound solutions. Below are a few evidenced-based best practices in applying instructional design fundamentals to develop next-generation training. These best practices have supported successful delivery and implementation of DoD learning solutions as explored in the case studies below.

Key Best Practice #1: Assess and Analyze Training Needs and Requirements

- Conduct media analysis to evaluate the most effective methods to satisfy learning outcomes, align to programmatic needs, and support the end user's infrastructure platform. Selection should consider the most appropriate delivery method for each learning objective to optimize ROI/ROE based on learning science, environments, and cost constraints (USFF, 2017, p. 15).
- Determine if the solution is best suited for lesson-based courseware or quick-access performance support.
- Consider performance capture and data analytics employed throughout the solution to help inform decision making.
- Concentrate on the most critical interactions. During analysis, identify the audience's key challenges, frequent mistakes on the job, and tasking that has been difficult to teach. Use media analysis outcomes to drive performance improvements in the identified competency areas.

Key Best Practice #2: Understand the Target Audience and their Environment

- Identify the target audience and their demographics, including how the implementation of certain modalities or instructional media may impact engagement and retention.
- Consider attitudes of the target audience in adopting and utilizing more technologically forward solutions.
- Consider how, when, and how often the learners will access the solution, including DoD IT infrastructure and standalone/learning management system (LMS) requirements.

Key Best Practice #3: Design Relevant and Realistic Contexts

- Present challenges that encourage learners to take risks and experience consequences, and deliver timely feedback.
- Work closely with program stakeholders, subject matter experts (SMEs), and the user community to offer realistic scenario-based elements within a safe training or rehearsal environment.

Key Best Practice #4: Use Iterative Design and Development Methodologies

- Use iterative development to implement new learning solutions in a way that reduces risk of cost overrun, enhances feedback cycles, and optimizes probability of customer satisfaction. This is especially applicable if stakeholders are anxious about training transformation and the adoption of emergent technologies.
- Allow stakeholders to review the solution in small iterations and provide frequent feedback, supplying opportunities for refactor and refinement execution in the subsequent iteration.

CASE STUDIES: BEST PRACTICES IN ACTION

Located at Naval Air Warfare Center Aircraft Division Webster Outlying Field (NAWCAD WOLF), the ePerformance Team has been applying instructional design fundamentals to next-generation training for decades, with over 30 years of experience providing instructional systems and performance support solutions for the warfighter. The team first began developing IETMs in the early 1990s and created the U.S. Navy's first IETM. The team's portfolio has since expanded to include interactive courseware (ICW), computer-based training (CBT), mobile learning applications, and XR for a range of user communities across the DoD.

The ePerformance Team relies on the strength of the instructional systems approach, and, maximizes technical efficiencies to drive product quality and ROI/ROE measured in the form of performance outcomes. They tout iterative design and development models as part of their core approach and tailor instructional design methods to sponsor- and product-specific requirements. Working as a multidisciplinary team, their instructional designers do not operate in a silo, but rather collaborate with software developers, graphic designers, and SMEs to develop training solutions for direct use by the warfighter.

In the case studies below, the team considered target audience, emergent technologies and capabilities, and IT infrastructure as the major drivers for requirements and optimized project parameters. The case studies illustrate the positive impacts of applying key best practices and instructional design fundamentals to next-generation training development.

Cartridge Actuated Device/Propellant Actuated Device Interactive Courseware

The Cartridge Actuated Device/Propellant Actuated Device (CAD/PAD) suite of ICW supports the training needs of the Naval Surface Warfare Center (NSWC) Indian Head Explosive Ordnance Disposal Technology Division (IHEODTD) and Naval Air Systems Command (NAVAIR) Program Management Activity (PMA)-201.

In the late 2000s, the CAD/PAD department at IHEODTD saw a rise in inadvertent actuations of fire extinguisher cartridges, primarily in the F/A-18. In 2010, the CAD/PAD program and the ePerformance Team set out to develop virtual safety training for the Fleet to complete every six months as part of their egress systems checkout. Training development occurred over the course of one year, and the new training requirement was added to the Naval Aviation Maintenance Manual over the following year. In 2012, the U.S. Navy added the ICW to the Naval Aviation Maintenance Program (NAMP) as mandatory training. Within the year, across all active F/A-18 squadrons, there was a marked 59-percent reduction in inadvertent actuations of the fire extinguisher. The CAD/PAD group attributed the decrease in incidents to this training (Schombs, 2018).

> After the success of the F/A-18 Fire Extinguisher [course], we rolled out ejection seat training, more fire extinguisher training, rescue hoist training, and other egress safety training across five different aircraft platforms. We estimate that this safety training saves [$50,000–100,000 per year] just in CAD/PAD alone. The real savings comes from reducing aircraft downtime, manpower cost, logistical/supply cost and reducing injury by providing egress safety awareness. (N. Schombs, personal communication, June 1, 2020)

The F/A-18 Fire Extinguisher course follows an engaging storyline led by a virtual drill sergeant who explains with ferocity the high cost of accidentally setting off the fire extinguisher. Learners are placed in simulated scenarios where they must complete tasks using system controls in the cockpit. These scenarios were designed around common errors that were causing the high number of inadvertent actuations. Remediation enables learners to make mistakes and then learn from them in a safe environment (see Figure 1).

Figure 1. F/A-18 Fire Extinguisher ICW

The safety training is presented in a Study→Practice→Test learning scaffold approach and provides flexibility for different learning levels. New learners can follow the curriculum at their own pace and test when ready; experienced professionals may prefer the option to test out immediately. The courseware is scenario-based and presents simulated aircraft environments using gamified elements to help maintenance personnel learn how to recognize safe and unsafe systems and controls. This virtualized training supports the user community of aircraft maintainers for several different platforms and is distributed via standalone desktop application and LMS.

ARC-210 Radio System Computer-Based Training & Performance Support

The ARC-210 learning solution supports the training needs of NAVAIR PMA-209 Air Combat Electronics. PMA-209 is responsible for providing training for the AN/ARC-210 radio set common equipment, which includes the AN/ARC-210 receiver-transmitter and ancillary equipment and systems, used by various platforms across the U.S. Navy, Marine Corps, and Air Force. The ARC-210 CBT is distributed via standalone desktop application and LMS and provides a blend of introductory training and just-in-time performance support to reach operators and maintainers with a broad range of experience.

This training and performance support application, which has been fielded for two different system configurations, was created to fill training gaps and provide simulated interactions with system hardware and software. Through TTA, SMEs identified the critical procedures and common errors that needed priority in the instruction. These training goals and learning objectives were translated into rich interactive activities that enhance the learners' knowledge of the capabilities, functions, and operations of the radio set. The application provides quick access to work instruction and simulated practices for common hardware and software tasks and missions scenarios that challenge learners to prove their competence of critical tasks in a simulated, game-based environment.

One of the mission scenarios allows learners to test their ability to remove and replace the radio's batteries using a simulated 3D model with real-time feedback and remediation (see Figure 2). Initial FEA determined that this task was being incorrectly performed at increased rates across the user community, leading to radio downtime and costly repair. Consequently, this task was worth the expanded interactive multimedia instruction due to criticality of mastery and level of behavior modification needed, using information gained through the instructional design process to inform course development and leveraging emergent technologies such as 3D modeling and simulation and data capture to improve performance outcomes.

Figure 2. ARC-210 Radio 3D Simulation of Battery Replacement

Consequence Management Communications Systems Interactive Courseware & Performance Support

Civil Support Team (CST) Assistant is a comprehensive electronic performance support solution offering platform-level IETM content with integrated virtualized training elements as ICW for use on a computer, government-issued mobile devices, and an immersive learning extension platform providing AR instruction as a hands-free performance aid. Supporting both the Army National Guard CST community and NAWCAD WOLF Special Communications Mission Solutions (SCMS) Consequence Management Communications Systems (CMCS) technical and sustainment support personnel, CST Assistant helps users perform setup, operations, and maintenance tasks. CST Assistant guides users through task completion with visual references such as videos, 360-degree walkthroughs, animations, diagrams, photographs, and step-by-step procedures for hardware and software. CST Assistant allows users to print instruction directly from the courseware, and with a new release deployed every two months, users are provided the most up-to-date information to facilitate operational and mission readiness (see Figure 3).

Figure 3. CST Assistant ICW

Instructional design analysis techniques such as FEA and TTA help to build a prioritized instructional backlog with tailored content across modalities to support training systems with an expanded range of capability. Learners gain a cohesive training experience across multiple learning modes. Modularized task analyses support project expenditures aligned to additional resources for targeted content and skill development. Using an agile-responsive instructional systems management approach, the project team can respond quickly to emergent training needs by providing unit costs based on instructional content rather than separating learning development effort from the technological capability.

By leveraging instructional design fundamentals such as target audience and media analysis, designing competency-based learning, and integrating instructional design as a key consideration in the production pipeline, the ePerformance Team has demonstrated how core methodologies can be evolved or transformed to develop impactful, next-generation learning solutions for the warfighter community in the new learning paradigm.

CONCLUSION

Today's instructional designers possess a body of accumulated knowledge and research that has been used successfully for decades to inform lesson design and theory; we should not discard past ideas as eLearning advances. Existing theory translates effectively to even the most advanced, cutting-edge eLearning platforms of today. Understanding the need for proper instructional design coupled with modern learning experiences facilitates the creation of sound training systems. The warfighter can attain similar next-generation training experiences for both modern and legacy systems when instructional designers have developed the training system utilizing instructional design fundamentals and key best practices. In an absence of fundamental instructional systems design and management approaches, impactful, next-generation instructional solutions such as the those discussed in this paper, may be reduced to technologically-forward, yet less-than-optimal training and performance support efforts. Training that utilizes emergent technologies but is devoid of sound instructional theory and learning science lacks the engine to close performance gaps. That is not to say that evolutions in emergent technology fail to provide or enhance good learning experiences, but if the goal is to close performance gaps and offer rich learning experiences, then instructional design fundamentals like those discussed in this paper must be treated as essential if not moreso than the shiny object allure of technical innovations.

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