Improving Training Transfer: Engineering Simulation-Based Experiential Learning into the Military Classroom

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Contemporary military institutional education and training culture is caught in a profound friction between 19th-century industrial paradigms focused on mass-learning efficiency with 17th century learning practices, and 21st-century information-saturated technology, rapid upskilling & learning requirements, and modern cognitive and learning science. Most military institutional training environments still operate using a "factory model" of education—a framework designed during the Industrial Revolution to produce disciplined, uniform learning within static and time-constrained curricula. This practice uses single expert-based lecture type instruction and/or computer-based “sequenced” media instruction with interactive but passive learner participation. This programmed "sage on the stage" approach treats learners as homogeneous empty vessels to be filled with expertise in a single session. This method continues despite the fact today we know that humans simply don’t learn that way nor does it prepare them to solve the modern complex military problems or objectives.

Research data shows these dated instructional methods correlate with a seemingly ignored “training transfer problem”. Transfer is the near and long-term ability to apply trained abilities in the real-work environment; however, research has shown learners often losing up to 70% of what they supposedly “learned” through traditional training courses. This loss occurs within days after the training concludes if it was not immediately applied and refreshed in a strategically spaced fashion. Meanwhile modern learning science shows well documented and predictive human learning decays when the instruction does not apply modern learning science-based methods and active learning. An example: meta-analyses comparing traditional instruction to a more progressive active instruction method in STEM fields showed that students in traditionally taught courses are 1.5 times more likely to fail than those participating in active learning.

This paper will report on a US Army sponsored research project meant to investigate if a modern competency-based experiential learning model can be incorporated into a traditional military institutional classroom setting at the US Military Academy. The methods included an integrated cadet-centered adaptive learning technology using immersive simulation, retrieval practice, and spaced repetition which align with how the human brain actually encodes long-term memory. We’ll discuss how our model was designed and tested to determine if it

develops the episodic experiential mental models needed for both near and long-term transfer. We will also discuss our application of the modern process called Learning Engineering, which not only subscribes to a systems-based approach to learning but synthesizes learning science into modern computer-based technical disciplines, human-factors based design, data-science and data analysis, as well as cognitive science and organizational (teams) theory into training development. Finally, we'll also provide the objective performance data produced from our research, learner responses, and how we employed AI-enabled adaptive learning support that enabled the learning "content" to produce novel simulation based experiences and has ability to match the content difficulty to the learners competency state. We'll also show how the AI can provide the learner with just-in-time information or instruction as needed during the real-practical experiences in a modern 21st century fashion.