

## Leveraging Emerging Classroom Technology to Improve Learning in the Army

The US Army Training and Doctrine Command (TRADOC) Enterprise Classroom Program (ECP) has been called upon in recent years to redesign today's Army classroom configurations to support emerging teaching methodologies with technology that supports 3D interactive simulation and Virtual Reality. Starting 18 months ago, the Petroleum Water Department (PWD) of the Quartermaster School in Fort Lee, VA began spearheading several new ECP initiatives that leverage emerging educational technologies to maximize learning in training delivery effectiveness in Military Occupational Specialties (MOS) Petroleum Supply Specialist lessons such as the Refuel on the Move (ROM) and Water Treatment Specialist Tactical Water Purification Systems (TWPS). The courses were delivered in an Active Learning environment (versus traditional lecture) which integrated new technology with revised curriculum to include lecture, group exercises and interactive simulation modules. Over the 18-month period, multiple instances of the course have been delivered in this environment and it has resulted in delivering successful results both in improved test scores to and a more engaging student experience that has benefitted the Army's Operational readiness.



PWD trains over 5,000 Soldiers and Marines annually in the fundamentals of petroleum operations for the battlefield of today. As the military continues to evolve technologically, our reliance on the emerging classroom technology continues to grow along with it. The Army's methodology for teaching Soldiers has changed over the years to reflect the evolutions in technology and the social means by which the students of today learn (i.e., student centric learning/collaboration or crowd learning).

The Army Learning Model (ALM), published in 2011, describes a continuous adaptive learning model that meets the needs of the All-Volunteer Army to develop adaptive, thinking Soldiers and leaders capable of meeting future challenges in an era of persistent conflict. One major aspect of the ALM is to incorporate adult learning theories to make Army instruction more student centric and more collaborative. This concept enables the Army's Content developers to move from reliance on lecture using slide presentations to curriculum that allows for more communication between students and their facilitators. The ALM emphasized using new educational technologies as enablers.

For this PWD environment we put an emphasis on Active Learning Strategies which helps to stimulate learners and instructors by creating an environment to help students engage in the classroom activities

based on proven concepts as to how people learn. By implementing an Active learning approach to the instruction, the students are asked to participate in the learning process in a "traditional" lecture class environment, it is common for only some Soldiers in a given course to participate in asking or responding to questions. In contrast, a class with successful active learning activities provides an opportunity for all Soldiers to think and engage with course material and practice skills for learning, applying, synthesizing, or summarizing that material.

Is this change effective? There is a well-established evidence base supporting the use of active learning. The benefits to using such activities include improved critical thinking skills, increased retention and transfer of new information, increased motivation, improved interpersonal skills, and decreased course failure. A 2017 National Survey of Student Engagement (NSSE) examined the engagement experiences of hundreds of thousands of students from over 1600 colleges and universities since 2000, shows that the outcomes provided reliable data showing that hands-on, integrative, and collaborative active learning experiences lead to high levels of student achievement and personal development. It is based on this we feel there is an opportunity to engage the Soldier in the learning and produce a better outcome. ***PWD has seen 50% faster tactical system set-up in the field (from 30 mins to 15 mins); 20% increase in aggregate test scores; and PWD has been able to reduce this lesson / block of instruction from 10 hours to 8 hours.*** In the "Refuel on the Move" lesson, a 3D digital training enabler is currently being used in the classroom in PWD as an activity. It provides the instructors and the students the ability to learn using 3-D rendered equipment on touch-enabled displays. PWD is redesigning the course content (expected in the Fall of 2020) at which time the school will introduce Virtual Reality activities in the same classrooms.

The use of the enhanced educational technologies in the classroom has greatly improved student outcomes and information retention. By making use of the 3D modeling and simulation in the classroom the student learns by doing and develops "muscle memory" as they have performed the critical tasks dozens of times before training on the actual equipment. This 'hands on' instruction has increased the number of students with first-time passing scores in their respective practical exercises. Learning has also become more efficient in that the students complete their training tasks more quickly. This has already had the effect of reducing time spent in school. PWD is also studying the effect this method has on reducing the breakage of training equipment. There is anecdotal evidence to support that new Soldiers are breaking their training equipment less because of the knowledge gained by training on the 3D simulations first.

Classroom configurations will evolve with the enhancements in technology and teaching methodologies. This stimulates changes in curriculum that benefits the students and Army readiness. The examples of PWD's use of digital training enablers provides a better return on investment through their use of effective training options presented within a virtual environment.

#### **National Training and Simulation Association (NTSA) Newsletter – FEB 2020**

##### **Authors:**

- Christopher Konicki – TRADOC Deputy Program Manager, TRADOC Enterprise Classroom Program (Ft. Eustis, VA);
- Joseph Record – TRADOC Training Support Program and Plans Analyst, TRADOC Enterprise Classroom Program (Ft. Eustis, VA)
- Jose Hernandez, Director, US Army Petroleum and Water Department (Ft. Lee, VA)
- Michael Sousa – Program Manager - Pragmatics Infrastructure Solutions