

**WHO**

**SYSCOM:** ONR

**Sponsoring Program:** Proposed FNC CMP-Fy22-01 Maintenance Tools for Operations and Training (MTOT) Program

**Transition Target:** Marine Corps College of Distance Education and Training (CDET)

**TPOC:** Peter Squire  
[peter.n.squire.civ@us.navy.mil](mailto:peter.n.squire.civ@us.navy.mil)

**Other Transition Opportunities:** Other programs in the Navy and other Services in which Warfighters must learn foundational knowledge by rote memorization and self-study.

**Notes:** Marine Adaptive Schoolhouse Training with E-learning Repetition Technology (MASTERY) is intelligent, adaptive digital flashcard software. MASTERY enables Schoolhouse instructors to bring principals of intelligent tutoring and learning science to their courses, accelerating their students' acquisition and retention of foundational knowledge. MASTERY presents material to the student intelligently, adapting to the student's proficiency to increase learning efficiency and effectiveness. MASTERY digital flashcard decks can be associated with courses students are enrolled in through the Marine Corps' MarineNet eLearning Ecosystem.



Image courtesy of Charles River Analytics

**WHAT**

**Operational Need and Improvement:** Marines require significant rote knowledge to perform effectively in a variety of MOSs. Instructors can employ tools that bring learning science to their courses to accelerate rote-knowledge acquisition and retention. Current one-size-fits all teaching and self-guided memorization can be inefficient and ineffective. Commercial flashcard apps do not implement parameterized adaptive training, are time consuming to create content for, are not integrated into the Marine Corp e-Learning ecosystem, and are not secure.

**Specifications Required:** To move USMC training from "an industrial age model to an information age model" requires (1) providing Marines with the most effective and efficient training and education (T&E) based on proven cognitive, social, behavioral, and learning science principles (USMC S&T Strategic Plan JCA 1: Force Support), (2) tools to reliably and accurately assess human performance that are affordable and unobtrusive that integrate into Marine Corps instructional products (USMC S&T Strategic Plan JCA 1/Training and Education STO-1: Learning and Performance Assessment), and (3) performance assessment that augments instructors' assessments, addresses the nuances of the wide range of training task performance and learning objectives, and is appropriate for the learners' specific proficiency level (USMC S&T Strategic Plan JCA 1/T&E STO-1).

**Technology Developed:** MASTERY provides Marines in Schoolhouses and Marines Awaiting Training with a mobile-first flashcard self-study tool. It integrated with the Moodle Learning Management System and so is ready for integration with the MarineNet eLearning ecosystem. MASTERY enables the USMC to retain secure control of training content and trainee learning performance data. Built-in authoring tools enable instructors to quickly add decks to their classes, using existing content in tools they already know (e.g., MS PowerPoint and Word). High-resolution tracking and reporting of individual student progress via xAPI data statements are written to a Marine Corps-selected Learner Record Store.

**Warfighter Value:** Students arrive better prepared for class enabling instructors can teach more advance material, and students become more proficient more quickly.

**WHEN**

**Contract Number:** N68335-20-C-0829

**Ending on:** Feb 16, 2024

Milestone	Risk Level	Measure of Success	Ending TRL	Date
Design adaptation algorithms, server, & user experience	N/A	Implement prototype components	3	4th QTR FY22
Develop and integrate software plug-ins	Low	Launch on Moodle 3.10 for stakeholder evaluations	4	2nd QTR FY23
Implement high-fidelity individual reporting	Low	Send xAPI statements to USMC-selected learner record store	5	2nd QTR FY23
Assess usability & efficacy	Medium	MASTERY tested within specific operational settings at Camp Lejeune	7	4th QTR FY23

**HOW**

**Projected Business Model:** We see two approaches to transitioning and commercializing MASTERY. First, the stand-alone applications or learning management system plugins can be licensed and distributed directly to end users via conventional app stores. Second, the underlying technologies can be licensed to other commercial entities that will use them directly or incorporate ATP components as added functionality to their commercial products.

**Company Objectives:** In the short-term, our objective is to continue usability testing and learning-outcome research of MASTERY at Marine Corps Schoolhouses. In collaboration with NAWC-TSD, we have conducted testing with the Marine Corps Engineering School (Camp Lejeune) and we have engaged with Schoolhouses at Camp Johnson and Twentynine Palms to plan additional testing. In the long term, our objective is to make MASTERY available to all Schoolhouses by working with CDET to integrate into MarineNet/Moodle and to expand to Navy foundational training programs.

**Potential Commercial Applications:** MASTERY technologies are being incorporated into our intelligent tutoring and adaptive training products, which will both increase their appeal as commercial products/services and enable us to provide consulting services to customers within the DoD, other Federal agencies, and commercial markets. MASTERY joins Charles River's family of intelligent, adaptive training products under our emerging Knows What You Need (KWYN™) brand ([cra.com/KWYN](http://cra.com/KWYN)).